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# MINOR PROJECT

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## FLOW VELOCITY
## AT
## RUBBLE MOUND BREAKWATER TOES

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Draft Report

Contents Amendment Record

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# 1. INTRODUCTION

## 1.1 BACKGROUND OF STUDY

This study is being undertaken as a minor research project as the TU Delft as part of a Masters Programme in Hydraulic Engineering. A minor project is has a typical duration of 8-12 weeks which is significantly shorter than a masters project which typically lasts 6-9 months. Minor research projects aim to assist and complement larger research projects or existing master thesis work and are more limited in scope due to the short time frame involved.

This study aims to complement work undertaken by Stephan Baart in 2008 where he investigated 'Toe structures for rubble mound breakwaters'.

## 1.2 BACKGROUND OF RESEARCH

Rubble mound breakwaters are frequently constructed in the maritime sector to protect infrastructure or land and to provide calmer waters. In the past research has been focused on armour layer stability as well as serviceability criteria. A result of the research into stability of armour has led to the frequently used Van der Meer and Hudson stability formulas for design. However, knowledge of stability criteria for the toe is still limited resulting in designers using past experience or rules of thumb based on practical knowledge.

Most outline breakwater designs are scale tested in a flume, which may result in design changes to improve stability. An improvement in knowledge and design guidance on toe stability would reduce the risk of major design changes being discovered at the scale testing phase and may reduce costs in design, testing and construction as overdesign would be reduced and an optimal design chosen early on.

Currently, toe stability is assessed by considering an acceptable damage level (NoD or %) which is linked to external loading parameters (wave height/ water level etc.) and resisting parameters (rock diameter / height of toe) typically via a stability number. This approach is mainly based on empirical experiments and fitted curves and has a limited relationship with the physical processes. A disadvantage of this approach is that the acceptable damage level as expressed does not take into account where the damage takes place or the structural impact of this damage. In addition, this approach is often limited in the application by the constraints and geometry of the experiments i.e. any significant deviations from the experimental set-up in the design conditions may result in large errors in the design.

Hence, a more process oriented approach with hopefully fewer drawbacks is desirable for design. A two step parameterisation model which focuses on physical processes has been proposed by Baart in his Master's Thesis in 2008 (Baart 2008). He proposes a two step model which seeks to correlate the load parameters and geometry to determine a local flow velocity in a first step. In a second step the model seeks to correlate the local velocity to a damage/ transport level. This short laboratory based research work intends to focus on the first step, the premise of correlating load parameters and geometry to determine a local flow velocity.

Laboratory tests have been carried out in the past concerning themselves with stability to breakwater toes establishing a direct link between load and a damage parameter (NoD) rather than a flow velocity. Notably, Gerding (Gerding 1993), Docters van Leeuwen (1996) and Van der Meer (1998) have carried out tests recently on breakwater toes. Most relevant to this research study is the laboratory work by Gerding which indicates the damage parameter for a given wave load and geometry.

Due to the short nature of the research duration and associated short report it is assumes that the reader is reasonably familiar with the subject matter discussed. Readers unfamiliar with the subject are encouraged to refer to 'Bed, Bank and Shore Protection' by Schiereck in the first instance and thereafter refer to the original thesis work undertaken by Baart and Gerding which elaborate the theory and relevant work in detail.

## 1.3 OBJECTIVE OF RESEARCH

This short research study aims to focus on the physical processes involved in the stability of breakwater toes and their parameterisation.

In particular, this research aims to further research linking load, geometry and a local velocity at the toe of a breakwater which would help lay the foundations for a possible two step parameterization model such as proposed by Baart.

The objective for this research is to focus solely on the velocity at the breakwater toe and its parameterisation or possible formulation as this is seen to be a first step towards a physical process model. It is expected that further research will be required to verify any initial results produced within the study as the number of experiments conducted will be very limited due to the time frame available. Further additional studies will also be required to consider the link between the damage level and any parameterized critical threshold velocity and a damage parameter which would enable design work.

# 2. Overview of Key Processes & Formulations

A brief overview of the key forces, processes and formulations involved is given below.

## 2.1 Overview of Processes & Forces

An overview schematic of a typical breakwater cross section is provided in Figure 1 below. Rocks in the toe structure are exposed to stabilising forces such as weight and friction/interlock and destabilising forces primarily due to wave action resulting in local flows through and above the toe. This includes forces due to porous flow through the structure and forces due to a flow over the toe bund refer to Figure 2.

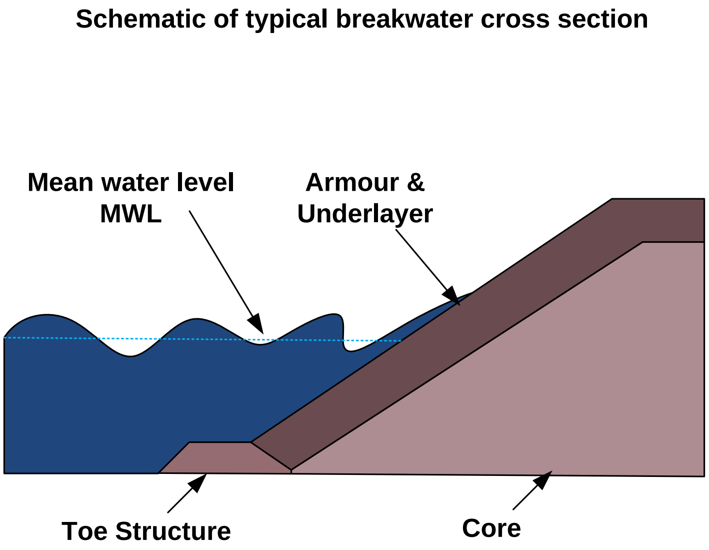


FIGURE 1 - SCHEMATIC OF BREAKWATER CROSS SECTION

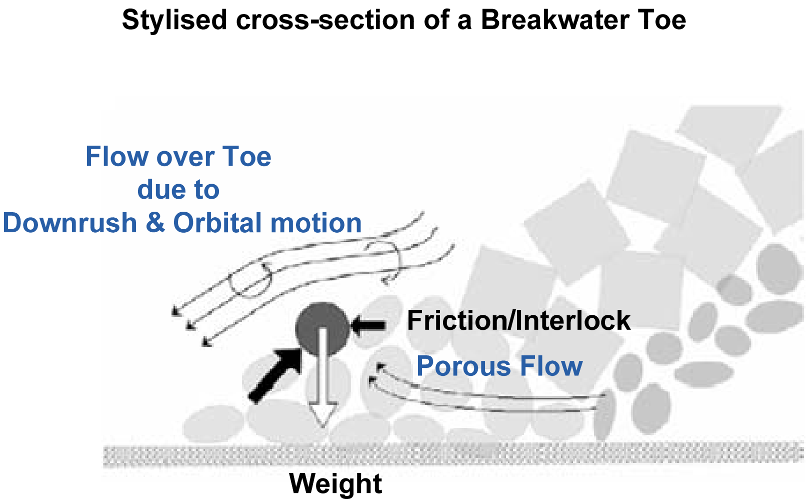


FIGURE 2-- FORCES ON TOE ROCKS, INITIAL FIGURE BY BAART 2008 WITH MINOR AMENDMENTS

## 2.2 OVERVIEW OF GOVERNING PARAMETERS

The porous flow velocity is likely to be dependent on the permeability of the structure, the head difference (Run-up, Run down, wave height, wave period) and the distance from slope.

The flow over the toe comprises of an element of wave down rush and wave orbital motion which are likely to depend on the wave height, period, run-up, rundown, slope of foreshore, slope of armour, permeability, roughness and the distance from slope.

Several of these parameters are dependent on each other and can be absorbed into key parameters and therefore do not require explicit inclusion in a model.

The perceived key governing parameters driving the local flow velocity u are

Loading based

| | |
|---|---|
| Wave height H expressed as either $H_{m0}$ or $H_s$ | [m] |
| Wave period, typically measured as peak, $T_p$ | [s] |
| Water depth at the structure $h_m$ | [m] |
| Kinematic Viscosity of fluid ν | $[m^{-2}\cdot s^{-1}]$ |
| Gravity | $[ms^{-2}]$ |

Toe Geometry Based

| | |
|---|---|
| Height of toe $h_t$ | [m] |
| Width of toe structure $b_t$ | [m] |
| Nominal stone diameter (roughness/voids) Dn50 | [m] |
| Slope of armour | [-] |
| Slope of foreshore | [-] |
| Distance from slope X | [m] |

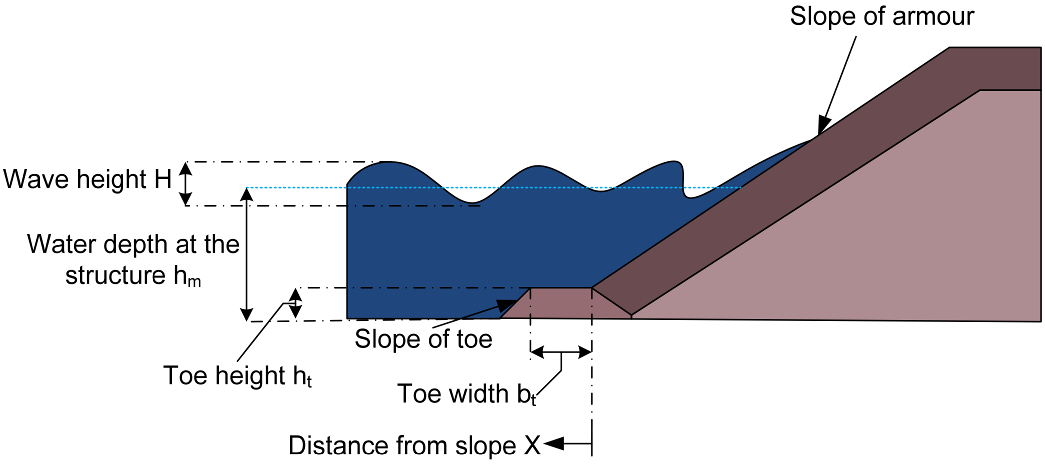


FIGURE 3- DEFINITION OF KEY PARAMETERS

## 2.3 Potential Formulation for Local Velocity

There are existing formulations for local wave induced velocities in deep and shallow water without obstructions such as breakwaters. Observation shows that waves cause orbital or ellipsoidal motions which diminish in magnitude with increasing water depth. A common expression for a local wave induced velocity is provided by the linear wave theory which presents horizontal and vertical velocity for waves respectively as:

EQUATION 1 $$\mathbf{u} = \frac{\pi \mathbf{H}}{\mathbf{T}} \frac{\cosh[\mathbf{k}(\mathbf{z}+\mathbf{d})]}{\sinh[\mathbf{kd}]} \cos(\mathbf{kx} - \boldsymbol{\omega}\mathbf{t})$$

EQUATION 2 $$\mathbf{w} = \frac{\pi \mathbf{H}}{\mathbf{T}} \frac{\sinh[\mathbf{k}(\mathbf{z}+\mathbf{d})]}{\sinh[\mathbf{kd}]} \sin(\mathbf{kx} - \boldsymbol{\omega}\mathbf{t})$$

Where

| | |
|---|---|
| $\boldsymbol{u}$ | is the horizontal wave component of orbital velocity [m/s] |
| $\mathbf{w}$ | is the vertical wave component of orbital velocity [m/s] |
| $H$ | is the wave height |
| $T$ | is the wave period |
| $k$ | is the wave number $(2\pi/L)$ |
| $\omega$ | is the wave angular frequency $(2\pi/T)$ |
| $t$ | is time and |
| $x$ | is the horizontal direction |

However, this expression is not valid in more complex cases when non-linear effects become significant.

Stephan Baart presented in his thesis the idea that the velocity at the toe of a breakwater may be presented by the two sinusoidal contributions one representing the orbital wave motion due to the incoming wave and a second sinusoidal type function due to the down rush component. He presents this as follows:

EQUATION 3 $$\boldsymbol{ub} = \boldsymbol{\hat{u}_b} \ \sin(\boldsymbol{\omega t} + \boldsymbol{\varphi}) = \boldsymbol{\hat{u}_{bi}} \sin(\boldsymbol{\omega t} + \boldsymbol{\varphi_{TA}}) + \boldsymbol{\hat{u}_{bdr}} \sin(\boldsymbol{\omega t})$$

Where

| | |
|---|---|
| $\hat{u}_{bi}$ | is the velocity of the incoming wave, |
| $\hat{u}_{bdr}$ | is the velocity due to the downrush, |
| $\varphi_{TA}$ | is the phase lag between the down rush and the incoming wave and |
| $\varphi$ | is the phase lag between the run-up and the resulting velocity |

# 3. APPROACH

## 3.1 OVERVIEW

The investigative approach chosen was to undertake physical model testing in a laboratory setting to determine whether typical velocity profiles exist at the toe and if they did, if they could be correlated to the geometry, loads and Baart's proposal.

This involved constructing a scale model of a breakwater toe inside a wave flume and generating specific wave fields (loads) with a wave generator whilst measuring velocities near the toe. The effect of the variation of key parameters on the local velocity is then reviewed.

## 3.2 LIMIT PARAMETERS & ENABLE COMPARISON

The study duration is relatively short; hence it has been decided to only investigate the effect of a few perceived key parameters. The remaining parameters are kept constant and may be investigated by later researchers.

Further, in order to enable a later comparison between velocity and damage, it has been decided to recreate Gerding's original experiments as far as possible whilst focusing on measuring local velocities. Hence, measured velocities in this study may later be correlated to levels of damage found by Gerding. The measured velocities are then analyzed to see whether there is a correlation between geometry and loads and whether the velocity potentially 'fits' Baart's proposed velocity equation. Dimensionless analysis and parametric curve fitting of data may also indicate potential formulations of velocity for a physical parameterization model.

# 4. LABORATORY TESTING

## 4.1 INTRODUCTION

All testing was undertaken at the TU Delft Hydraulics laboratory. The flume section available at the time was approximately 27m long, 0.8m wide and 0.9m high. This is smaller than the flume section available to Gerding who had a test flume of 50m length, 1m wide and 1.2m high. Hence, the experimental set-up by Gerding had to be marginally modified to fit within the available flume, a comparison between the model characteristics is provided in Table 1.

**TABLE 1 - COMPARISON OF KEY PARAMETERS IN GERDING EXPERIMENT AND NEW EXPERIMENT**

| **Description** | **Gerding Experiment** | **New Experiment** |
|---|---|---|
| Flume Dimension | • 50m long<br>• 1m wide<br>• 1.2m high | • 27m long<br>• 0.8m wide<br>• 0.9m high |
| Wave Characteristics | • Preset Jonswap spectrum | • Regular waves<br>• Pre-set Jonswap spectrum |
| Pre-set Significant Wave Height | • Hs = 0.15m,<br>• Hs=0.2m,<br>• Hs= 0.25m | • Hs = 0.1m,<br>• Hs= 0.15m,<br>• Hs= 0.2m |
| Wave steepness $s = \frac{2\pi H_s}{gT^2}$ | • s=0.02<br>• s=0.04<br>• s=0.03 | • s= 0.02<br>• s= 0.04 |
| Toe stone diameter | Split flume into three sections<br>• Dn50=0.017m,<br>• Dn50=0.025m,<br>• Dn50= 0.035m,<br>• Dn50=0.04m<br>with D85/D15=1.15-1.3 | Split flume into two sections:<br>• Use Dn50=0.035m<br>• Use Dn50=0.025m<br>with D85/D15=1.15-1.3 |
| Water depths at structure | • hm= 0.5m,<br>• hm=0.4m,<br>• hm=0.3m | • hm= 0.4m,<br>• hm=0.3m,<br>• hm=0.2m |
| Duration | Each test 1000 waves | • Regular wave test approx. 50 waves<br>• Jonswap wave field 1000 waves |
| Foreshore slope | • 1:20 | • 1:20 |
| Armour slope | • 1:1.5 | • 1:1.5 |
| Toe height variation | • ht= 0.08m,<br>• ht=0.15m,<br>• ht=0.22m | • ht= 0.08m,<br>• ht=0.15m |
| Toe width variation | • bt=0.12m,<br>• bt= 0.2m,<br>• bt=0.3m | • bt=0.12m |
| Measurements | Rock displacement<br>Damage no | Measurements to be taken :<br>o Flow Velocity along a constant horizontal line (ADV)<br>o Run-up/ run-down (mesh-gird)<br>o Use dye/reflective particles to visualise particle orbit/ path |

## 4.2 EXPERIMENTAL SET-UP

### 4.2.1 OVERVIEW

The Figure 4, 5 and 6 below provide a cross sectional overview and detailed cross section of the experimental set-up and measuring points. The Figure 7 provides an overview of the instrument and measuring set-up.

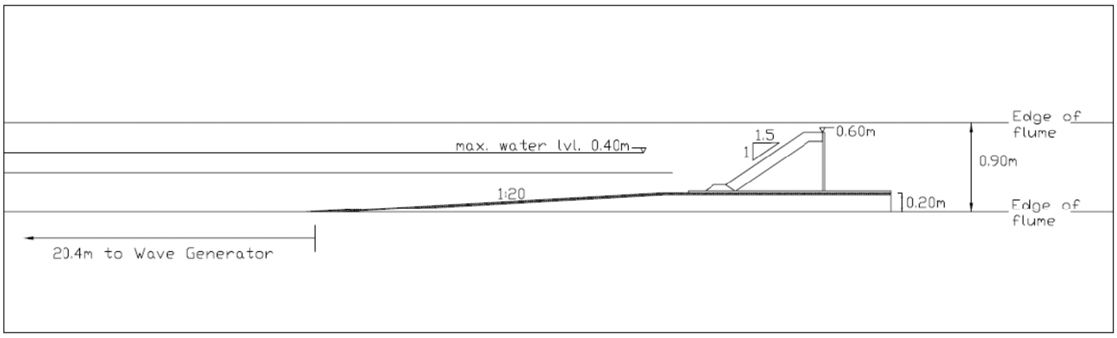


FIGURE 4- EXPERIMENTAL SET UP – CROSS SECTIONALOVERVIEW

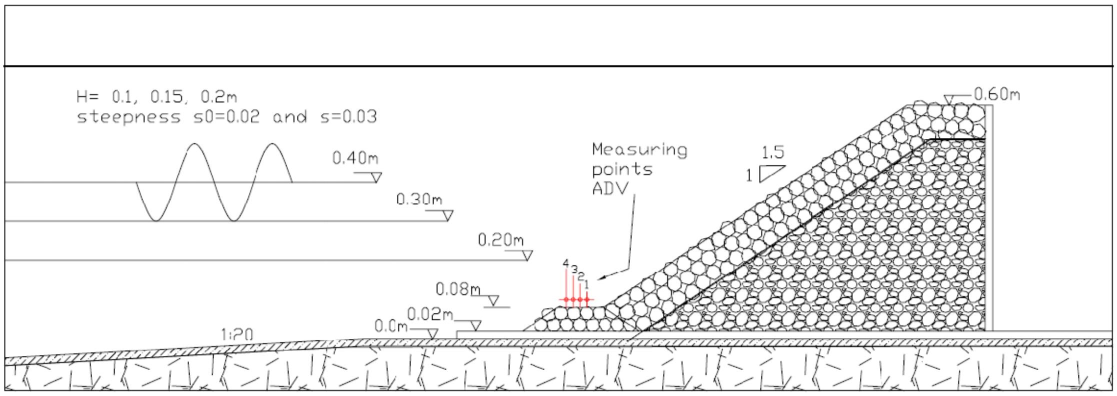


FIGURE 5- EXPERIMENTAL SET-UP – DETAILED CROSS SECTION

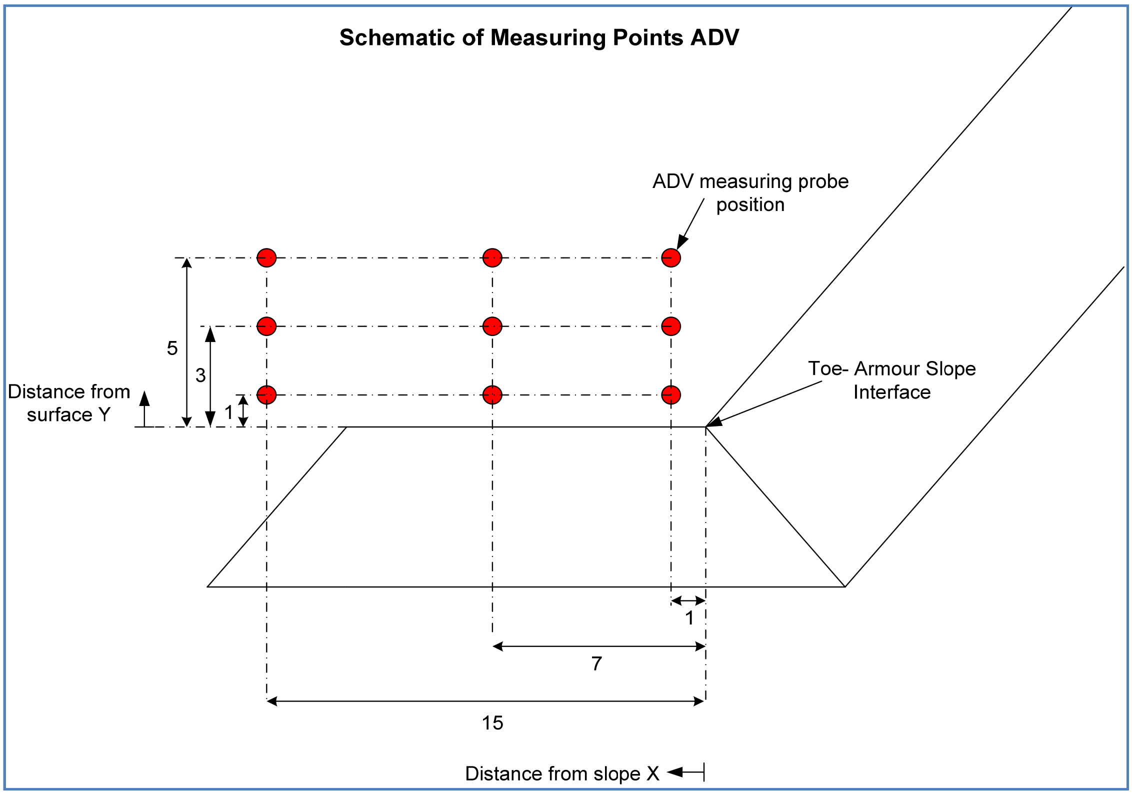


FIGURE 6- EXPERIMENTAL SET-UP – SCHEMATIC OF MEASURING POINTS (ALL MEASUREMENTS IN CM)

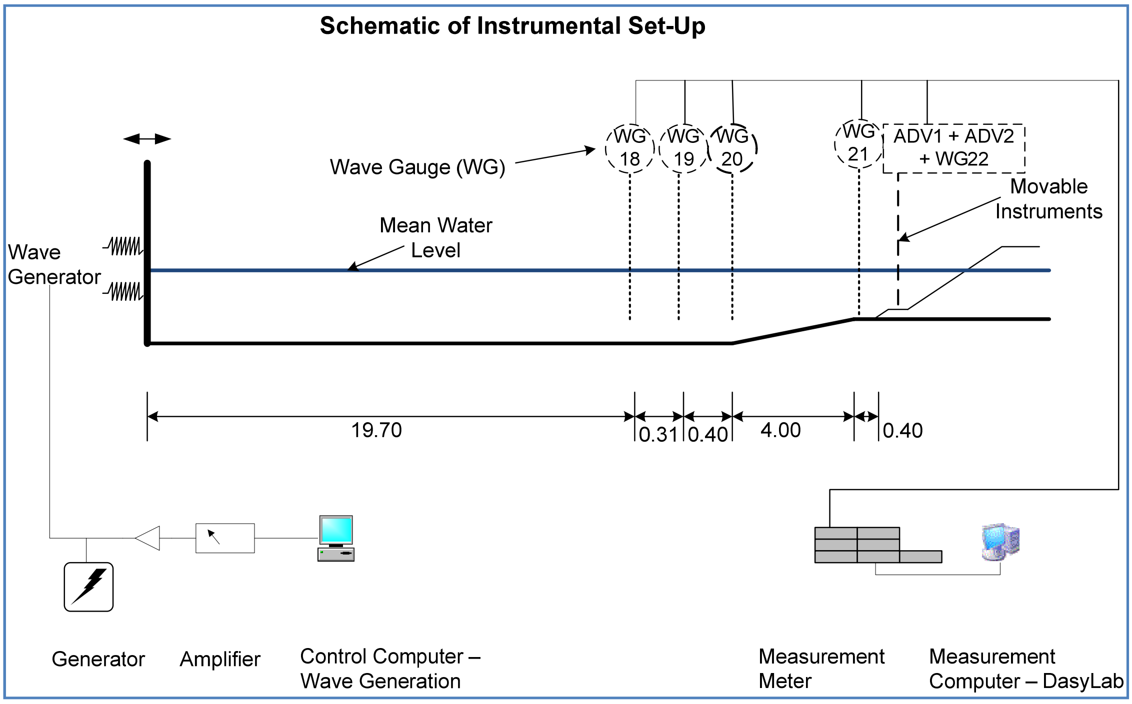


FIGURE 7- INSTRUMENTAL SET-UP (ALL MEASUREMENTS IN M)

### 4.2.2 DESCRIPTION

During the experiment waves were generated by a programme according to the testing schedule and then transferred to a ‘control computer’ which steered the wave generator. During the initial set-up and testing phase of the experiment numerous errors occurred with the ‘wave compensator’ due to the short length of flume and the large reflection caused by the presence of the breakwater. Systematic error checking was undertaken and the compensator repaired and the settings optimised by laboratory staff. However, even after repair the compensator remained vulnerable to high wave heights relative to low water levels. This meant that several scheduled tests could not be completed due to instrumental failure.

Wave gauges were placed before the slope to measure the actual wave height in the channel and to enable validation of the pre-set level. The wave gauge number shown in the figure above corresponds to the actual TU Delft water laboratory numbering system of wave gauges.

For the velocity measurement two Acoustic Doppler Velocimeters (ADVs) have been utilized due to availability in the laboratory, ease of set-up and relatively high accuracy. The ADVs were placed on a moveable timber frame with a wave gauge (WG22) fixed on the centre line of the flume.

The ADV 1 has been fixed on the frame midway across the larger rock armour section (Dn50=0.035m). Similarly, the ADV2 instrument has been fixed in the centre of the smaller rock armour section (Dn50=0.025m). The timber frame allowed incremental horizontal movements and handles on the individual instruments with the measuring rod attached allowed for vertical movement. It was noted during prior experimentation with the ADVs that ADV1 has previously shown errors on one beam, the beam 3. Hence during testing the positive y-direction beam was placed in direction parallel to the incident waves to enable accurate measurements in this direction. For the ADV2, the standard setting of the x-direction parallel to the incident wave direction has been used. The Table 2 indicates the direction and output of velocity files.

It should be noted that an important limitation of any ADV is the requirement to be immersed in water to provide readings. Further, the instruments provides inaccurate readings in too clear or too ‘dirty’ water due to the need to have a reasonable number of particles in the water to reflect the acoustic signal. Therefore the ADV readings were monitored during the experiment and the measured particle count was adjusted throughout accordingly to provide reasonable accuracy.

All instrument measurements were recorded synchronously via the software ‘DasyLab’. The key parameters and output format are presented in the table below. Calibration coefficients on the output files were used to translate the output into actual beam velocities, xyz velocities and water level elevations. The calibration coefficients are given in the Table 3. For reference, an extract of the laboratory lab book is provided in the Appendix A.

TABLE 2 - DASYLAB OUTPUT AND FILE CONVENTION

| *Instrument Input Channel* | *Description of measured quantity* | | *Description* | *Output Column* |
|---|---|---|---|---|
| 0 | Time | | Time | 1 |
| 1 | G18 | | Water level at G18 | 2 |
| 2 | G19 | | Water level at G19 | 3 |
| 3 | G20 | | Water level at G20 | 4 |
| 4 | G21 | | Water level at G21 | 5 |
| 5 | G22 | | Water level at ADV | 6 |
| | | | **measuring point (G22)** | |
| 6 | ADV1-x | Beam 1 | Southern Beam* | 7 |
| 7 | ADV1-y | Beam 2 | Western Beam* | 8 |
| 8 | ADV1-z1 | Beam 3 | Northern Beam* | 9 |
| 9 | ADV1-z2 | Beam 4 | Eastern Beam* | 10 |
| 10 | ADV2-x | Beam 1 | Western Beam* | 11 |
| 11 | ADV2-y | Beam 2 | Northern Beam* | 12 |
| 12 | ADV2-z1 | Beam 3 | Eastern Beam* | 13 |
| 13 | ADV2-z2 | Beam 4 | Southern Beam* | 14 |

* The convention for direction assumes a plan view from above onto the ADV, where the western beam is pointing towards the wave generator and the eastern beam towards the breakwater

TABLE 3 - INSTRUMENTAL CALIBRATION COEFFICIENTS

| **Description** | | **Coefficient** | **Description** | **Coefficient** |
|---|---|---|---|---|
| Water level | | 0.025 | | |
| Beam velocity | | 0.12 | | |
| Beam Velocity (BV) to X,Y,Z velocity Transformation Matrix (TM) coefficients as per instrument output file<br>[X,Y,Z Velocity] = [TM] x [BV] | ADV1 – B1 cof 1 | 8318/4096 | ADV2 - B1cof 1 | 8161/4096 |
| | ADV1 – B1 cof 2 | 8329/4096 | ADV2 - B1cof 2 | 8165/4096 |
| | ADV1 - B2 cof 1 | 8458/4096 | ADV2 - B2cof 1 | 8425/4096 |
| | ADV1 - B2 cof 2 | 8494/4096 | ADV2 - B2cof 2 | 8362/4096 |
| | ADV1 - B3cof 1 | 2134/4096 | ADV2 - B3cof 1 | 2122/4096 |
| | ADV1 - B3cof 2 | 2091/4096 | ADV2 - B3cof 2 | 2108/4096 |
| | ADV1 - B4cof 1 | 2182/4096 | ADV2 - B4cof 1 | 1986/4096 |
| | ADV1 - B4cof 2 | 2038/4096 | ADV2 - B4cof 2 | 2236/4096 |

## 4.3 SUMMARY OF TESTING SCHEDULE

A testing schedule has been devised to enable the analysis of the change one parameter on the velocity. A summary of the testing schedule is provided in the tables below.

The local velocity measurements were undertaken in regular intervals at the same or similar geometric position for all experiments for comparison purposes. The typical grid positions include:

- typically a distance to the measuring probe from the average horizontal toe surface level Y of
    - 1cm, 3cm, and 5cm
- Two detailed experiments with additional Y measurements at:
    - 7cm, 9cm, 11cm, 13cm, 15cm and 17cm
- typically a distance from the toe/slope interface to the measuring probe X of
    - 1cm, 7cm and 15cm
- In addition some further positions of X
    - 3cm , 5cm, 9cm, 11cm and 13cm
- Measurements with the increased toe height of $h_t$=0.15m were offset in the x-direction by 0.5cm due to a measuring error during the experiments

In some instances it was not possible to take measurement at a standardized measuring point due to localized water drawdown and excessive air entrainment affecting the measuring probe. In such cases an adjacent measurement position was sought in the first instance and if this also failed to yield adequate results then the point was abandoned.

TABLE 4 - TESTING SCHEDULE FOR REGULAR WAVES WITH TOE HEIGHT OF 0.08M

| Regular Waves<br>Test Name | Height of toe $h_t$ [m] | Height of water $h_m$ [m] | Wave Height $H_s$ [m] | Wave Period T [s] | Wave Steepness S | Tested |
|---|---|---|---|---|---|---|
| R001 | 0.08 | 0.4 | 0.10 | 1.790 | 0.02 | ✓ |
| R002 | 0.08 | 0.4 | 0.10 | 1.265 | 0.04 | ✓ |
| R003 | 0.08 | 0.4 | 0.15 | 2.197 | 0.02 | ✓ |
| R004 | 0.08 | 0.4 | 0.15 | 1.898 | | ✓ |
| R005 | 0.08 | 0.4 | 0.15 | 1.550 | 0.04 | ✓ |
| R006 | 0.08 | 0.4 | 0.20 | 2.531 | 0.02 | ✓ |
| R007 | 0.08 | 0.4 | 0.20 | 1.789 | 0.04 | ✓ |
| R008 | 0.08 | 0.3 | 0.10 | 1.790 | 0.02 | ✓ |
| R009 | 0.08 | 0.3 | 0.10 | 1.265 | 0.04 | ✓ |
| R010 | 0.08 | 0.3 | 0.15 | 2.197 | 0.02 | ✓ |
| R011 | 0.08 | 0.3 | 0.15 | 1.898 | | ✓ |
| R012 | 0.08 | 0.3 | 0.15 | 1.550 | 0.04 | ✓ |
| R013 | 0.08 | 0.3 | 0.20 | 2.531 | 0.02 | × failure |
| R014 | 0.08 | 0.3 | 0.20 | 1.789 | 0.04 | × failure |
| R015 | 0.08 | 0.2 | 0.10 | 1.789 | 0.02 | ✓ |
| R016 | 0.08 | 0.2 | 0.10 | 1.265 | 0.04 | ✓ |
| R017 | 0.08 | 0.2 | 0.15 | 2.197 | 0.02 | ✓ |
| R018 | 0.08 | 0.2 | 0.15 | 1.898 | | × failure |
| R019 | 0.08 | 0.2 | 0.15 | 1.550 | 0.04 | × failure |

**TABLE 5 - TESTING SCHEDULE FOR IRREGULAR WAVES WITH TOE HEIGHT OF 0.08M**

| Irregular Waves Test Name | Height of toe $h_t$ [m] | Height of water $h_m$ [m] | Wave Height $H_s$ [m] | Wave Period T [s] | Wave Steepness S | Tested |
|---|---|---|---|---|---|---|
| I020 | 0.08 | 0.4 | 0.10 | 1.790 | 0.02 | ✓ |
| I021 | 0.08 | 0.4 | 0.10 | 1.265 | 0.04 | ✓ |
| I022 | 0.08 | 0.4 | 0.15 | 2.197 | 0.02 | ✓ |
| I023 | 0.08 | 0.4 | 0.15 | 1.550 | 0.04 | ✓ |
| I024 | 0.08 | 0.4 | 0.20 | 2.531 | 0.02 | × failure |
| I025 | 0.08 | 0.4 | 0.20 | 1.789 | 0.04 | × failure |
| I026 | 0.08 | 0.3 | 0.10 | 1.790 | 0.02 | ✓ |
| I027 | 0.08 | 0.3 | 0.10 | 1.265 | 0.04 | ✓ |
| I028 | 0.08 | 0.3 | 0.15 | 2.197 | 0.02 | ✓ |
| I029 | 0.08 | 0.3 | 0.15 | 1.550 | 0.04 | ✓ |

**TABLE 6 - TESTING SCHEDULE FOR REGULAR WAVES WITH TOE HEIGHT OF 0.15M**

| Regular Waves Test Name | Height of toe $h_t$ [m] | Height of water $h_m$ [m] | Wave Height $H_s$ [m] | Wave Period T [s] | Wave Steepness S | Tested |
|---|---|---|---|---|---|---|
| R030 | 0.15 | 0.4 | 0.10 | 1.790 | 0.02 | ✓ |
| R031 | 0.15 | 0.4 | 0.10 | 1.265 | 0.04 | ✓ |
| R032 | 0.15 | 0.4 | 0.15 | 2.197 | 0.02 | ✓ |
| R033 | 0.15 | 0.4 | 0.15 | 1.898 |  | ✓ |
| R034 | 0.15 | 0.4 | 0.15 | 1.550 | 0.04 | ✓ |
| R035 | 0.15 | 0.4 | 0.20 | 2.531 | 0.02 | ✓ |
| R036 | 0.15 | 0.4 | 0.20 | 1. 789 | 0.04 | ✓ |
| R037 | 0.15 | 0.3 | 0.10 | 1.790 | 0.02 | ✓ |
| R038 | 0.15 | 0.3 | 0.10 | 1.265 | 0.04 | ✓ |
| R039 | 0.15 | 0.3 | 0.15 | 2.197 | 0.02 | ✓ |
| R040 | 0.15 | 0.3 | 0.15 | 1.898 |  | ✓ |
| R041 | 0.15 | 0.3 | 0.15 | 1.550 | 0.04 | ✓ |
| R042-R048 |  |  |  |  |  | × failure |

**TABLE 7 - TESTING SCHEDULE FOR REGULAR WAVES WITH TOE HEIGHT OF 0.15M**

| Irregular Waves Test Name | Height of toe $h_t$ [m] | Height of water $h_m$ [m] | Wave Height $H_s$ [m] | Wave Period T [s] | Wave Steepness S | Tested |
|---|---|---|---|---|---|---|
| I049 | 0.15 | 0.4 | 0.10 | 1.790 | 0.02 | ✓ |
| I050 | 0.15 | 0.4 | 0.10 | 1.265 | 0.04 | ✓ |
| I051 | 0.15 | 0.4 | 0.15 | 2.197 | 0.02 | ✓ |
| I052 | 0.15 | 0.4 | 0.15 | 1.550 | 0.04 | ✓ |
| I053 | 0.15 | 0.4 | 0.20 | 2.531 | 0.02 | × failure |
| I054 | 0.15 | 0.4 | 0.20 | 1.789 | 0.04 | × failure |
| I055 | 0.15 | 0.3 | 0.10 | 1.790 | 0.02 | ✓ |

# 5. RESULTS AND ANALYSIS

## 5.1 REGULAR WAVES

### 5.1.1. VERIFICATION OF LOAD CHARACTERISTICS

The recorded water level measurements were reviewed prior to analysis of other data to determine that the specified input wave height and periods were achieved for each experiment. For the verification of the actual wave heights and periods achieved in the model the measurements were evaluated using a standard TU DELFT matlab routine 'decomp'.

For the regular wave tests the measured 'offshore' wave height deviated by approx. 3-7mm and the measured peak wave period deviated by typically by about 0.002 of a second from those specified in the testing schedule.

### 5.1.2. REVIEW OF HORIZONTAL VELOCITY OVERALL

For the regular wave test, the measured velocity displayed a regularly repeating pattern for all experiments and both rock sizes tested. An extract from a typical velocity measurement record is shown in Figure 8 below. The measured regular pattern was not always simply sinusoidal and there appear to be other contributions affecting the velocity. Further, there are fluctuations in the local measured velocity which appear to be partly due to turbulence and partly due to measuring inaccuracies.

Nevertheless, the period of the measured velocity determined by a power spectrum density (PSD) estimate of the velocity was the same as the wave period which is in line with expectations. A plot of a typical PSD estimate is shown in Figure 9.

The PSD plot also shows a number of smaller peaks which are typically at frequencies which are a multiple of (a natural number) the peak period. In addition to this, there appear to be in some tests some very small peaks at around 40 to 45Hz which may be due to instrument noise. Noise overall in the PSD is small which only seen when zooming in very close and no particular pattern has been indentified in this.

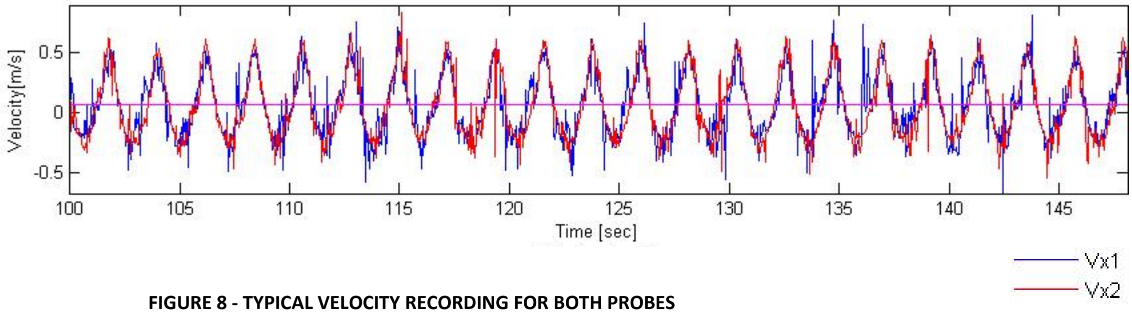


**FIGURE 8 - TYPICAL VELOCITY RECORDING FOR BOTH PROBES**

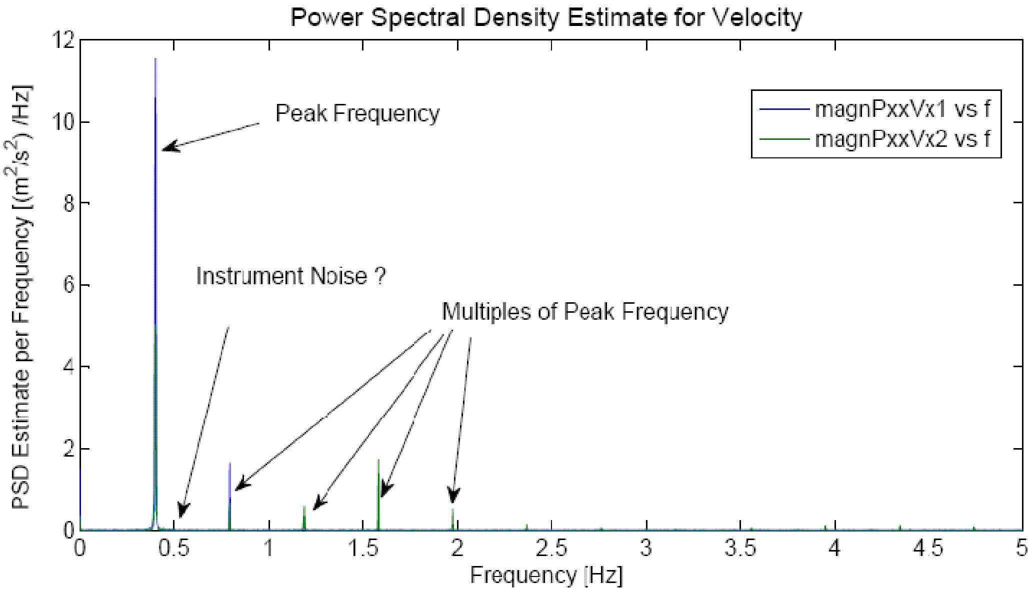


FIGURE 9 - TYPICAL PLOT OF PSD ESTIMATE FOR VELOCITY

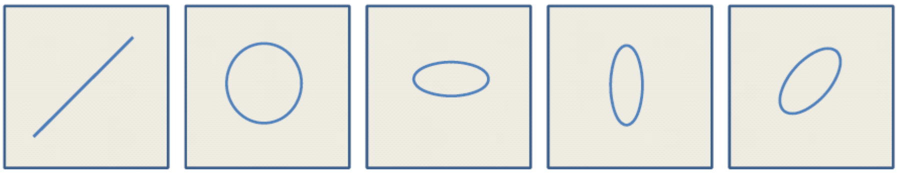
### 5.1.3 REVIEW OF LOCAL WATER LEVEL AND HORIZONTAL VELOCITY

The PSD plot results have shown that the water level and velocity have the same period which indicates that the water level is the main driver of the velocity.

A Lissajous type plot correlating the local water level and velocity as measured at various locations along the toe has been undertaken for all experiments to develop an overall understanding regarding the relationship between the period of the water level and the period of the velocity and to establish whether these are in phase. In the plots the x and y axis have been fixed to the same scale for all experiments for comparison purposes.

**Note**

For readability of the report only a select few figures are included in the main body of the report, Lissajous type figures for all regular wave experiments are presented in the Appendix C. For the reader unfamiliar with Lissajous plots, the Figure 10 below has been included to show the most common shapes and their meaning in relation to phase and amplitude.



In Phase

Phase shift of π/2

Phase shift of π/2
and X ampl.> Y ampl.

Phase shift of π/2
and X ampl. <Y ampl.

Phase shift of π/4

FIGURE 10 - TYPICAL SHAPES OF LISSAJOUS PLOTS

**Influence of Toe Height**

The figures indicate that the height of toe has little influence on the phase and only marginal differences are visible when comparing the R001 experiment series of plots with the R030 series of plots when all other parameters are kept the same. A representative example of the similarity is given in Figure 11 and Figure 12 which have identical wave loading parameters but different toe heights. Generally the shapes of the curves are very similar, but there appears to be a marginally larger phase shift for the higher toe level (the R030 series of experiments).

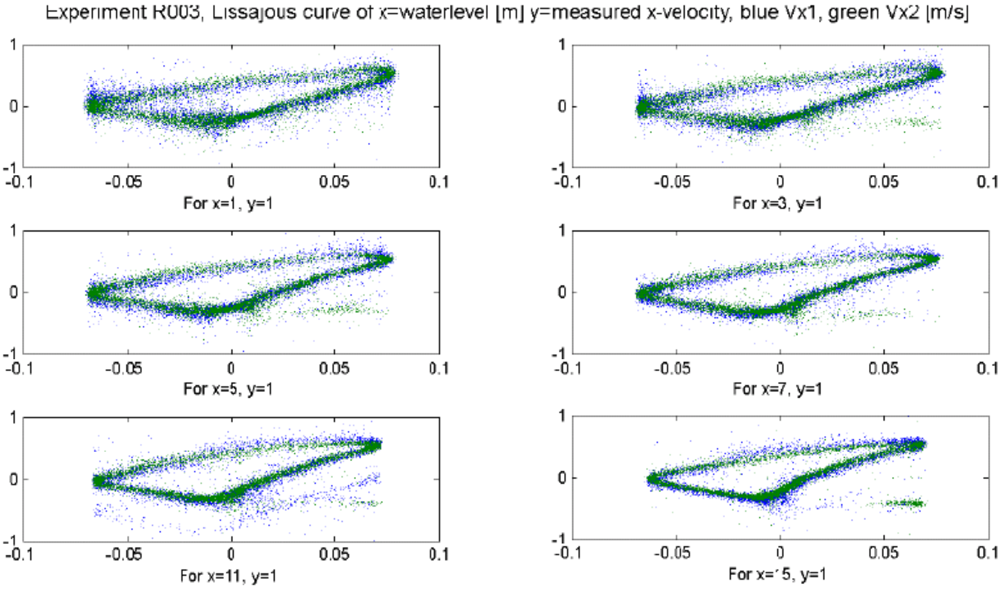


FIGURE 11 - LISSAJOUS PLOTS FOR R003 WITH HT=0.08M, HS=0.15M, HM=0.4M, TP=2.197

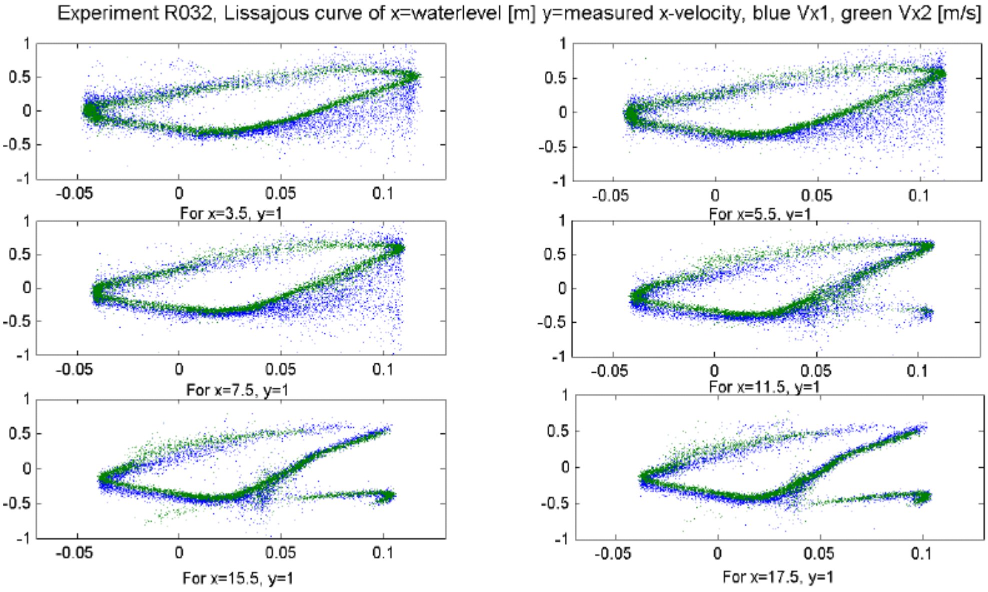


FIGURE 12 - LISSAJOUS PLOTS FOR R032 WITH HT=0.15M, HS=0.15M, HM=0.4M, TP=2.197

**Influence of Wave Height to Water Level Ratio (Breaker Index)**

The plots indicate that for low ratios of 'offshore' significant wave height to water level (typically Hs/Hm < 0.3) there is a small to no phase shift (approx. $0° \leq \delta \leq 45°$) dependent on the distance away from the toe (indicated by x= below the plot). This ratio is also referred to in literature as the breaker index $\gamma$. An example of a Lissajous type plot with a low breaker index is given in Figure 13 below.

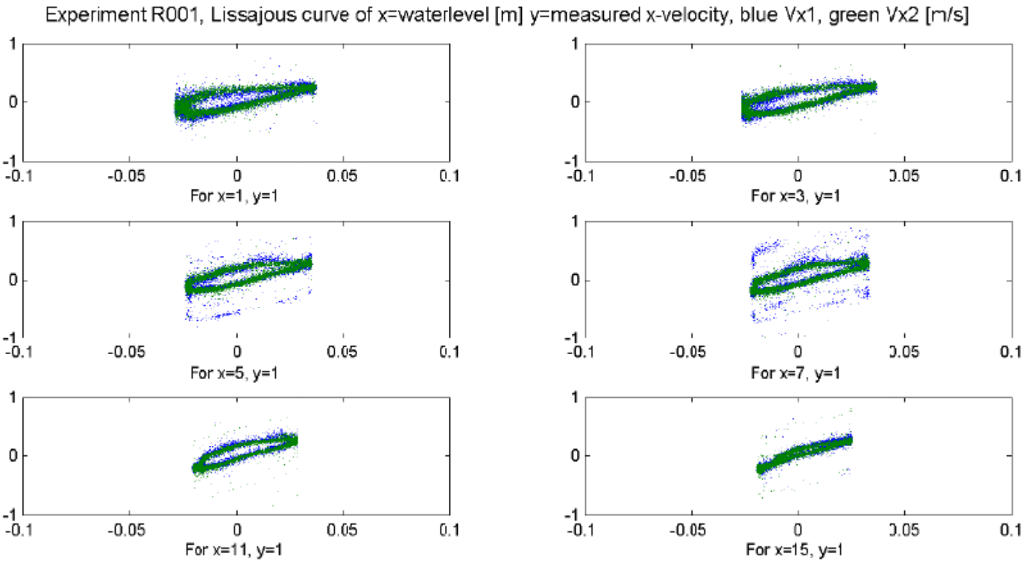


FIGURE 13 - EXAMPLE OF LOW BREAKER INDEX (WAVE HEIGHT TO WATER LEVEL RATIO<0.3)

For larger breaker ratios (typically > 0.3) a significant phase shift is typically present. In addition the trough of the wave up to the mean still water level seems to be display an inclined b-shape or wedge-shape in the Lissajous plot. An example of such a plot is shown in Figure 14.

Often, the crest of the wave appears in these plots in phase or only marginally out of phase. The bottom of the Lissajous shape indicates the presence of a sizeable additional velocity component which results in an increased amplitude and/or a phase difference at those location, particularly at the trough of a wave.

The additional velocity component could be viewed as the 'down rush' whereas the more regular oval shapes and lines could be seen as the regular wave orbital wave component. No attempt has been made to separate these contributions due to the variability in the data, the difficulty involved and the short time scale of the study. However, this may be an approach to quantify down rush in future and may validate the proposed velocity formulation by Baart (Equation 3).

**Influence of Wave Period**

The plots indicate that a higher wave period increases the phase shift.

**Influence of Distance from Toe**

The phase shift also appears to be dependent on the distance from the toe and varies. However, no particular pattern has been identified.

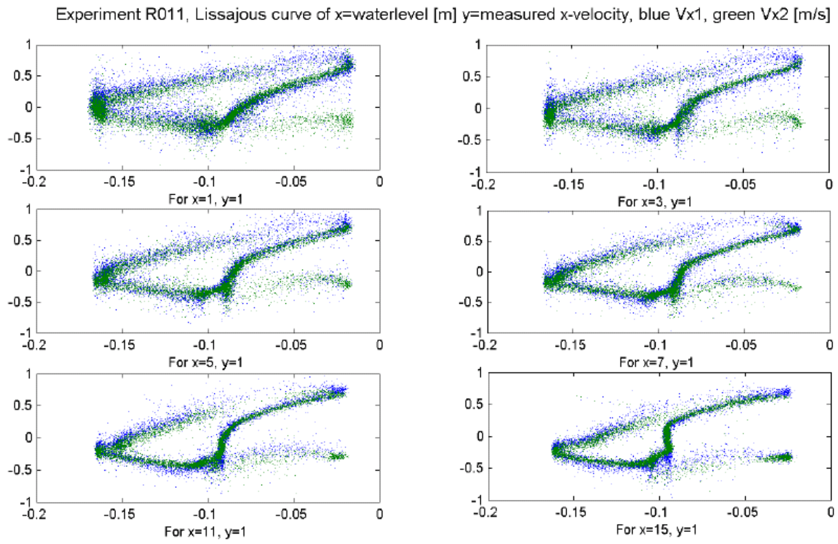


FIGURE 14 - EXAMPLE OF HIGH BREAKER INDEX (WAVE HEIGHT TO WATER LEVEL RATIO > 0.3)

### 5.1.4 CHARACTERISATION OF LOCAL HORIZONTAL VELOCITY

The measured results of the regular wave tests are numerous and large in size making analysis and characterization difficult. Curve fitting has been utilized to 'distil' the data to highlight potentially useful information from the remainder to enable the formation of any conclusions about the tests.

The velocity profile has been analyzed and fitted to a first order Fourier series (as shown in Equation 3) to determine a characteristic velocity and characteristic maximum velocity (as shown in Equation 4) that can be compared for a number of tests.

Further, Equation 3 is similar to Gerding's proposal for velocity (Equation ) and can be easily transformed to fit Gerding's equation format. The residual, as shown in Equation 5, is considered the 'error' of the fit which includes random noise and turbulence. An example of measured versus Fourier fitted velocity curve and remaining residual is shown below in the Figure 15. A table which presents all Fourier coefficients for all regular tests is included in Appendix B.

**EQUATION 3** $U_{fitted} = a_0 + a_1 \cos(\omega x) + b_1 \sin(\omega x)$

where $\omega = 2 * \pi / T$ and

T is the wave height period and

$a_0$ , $a_1$ and $b_1$ are constants of the fit

**EQUATION 4** $U_{fitted\,max} = (a_1^2 + b_1^2)^{0.5} \pm a_0$

**EQUATION 5** $Residual\ R = U_{measured} - U_{fitted}$

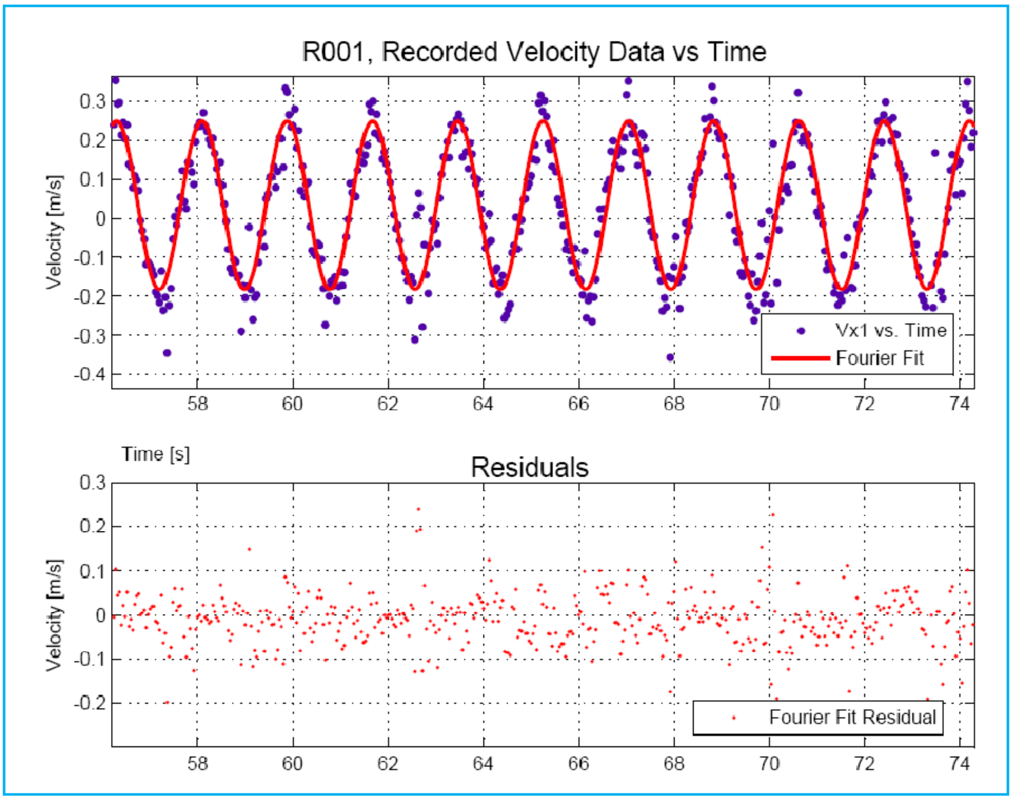


**FIGURE 15 - FOURIER FITTED VELOCITY PROFILE FOR TEST R001**

It should be noted that the first order Fourier fit utilized is less good for higher waves and for the rougher armour rock where turbulence is higher and higher order terms become more important. This means that the residual for those experiments is higher and the accuracy of the fit is lower and that curve fitted results of those experiments should be utilized with caution.

For each experiment a plot of the maximum characteristic velocity was undertaken to determine the maximum velocity distribution across the toe of the breakwater. For readability, only two representative plots one for the toe height of 0.08m (Figure 16) and one for the toe height of 0.15m (Figure 17) are included in the main body of the report, plots for all experiments are in the Appendix C.

The x-axis in the figures indicates the distance from the rock slope and toe interface positive in the direction away from the interface to the measuring point; the y-distance indicates the vertical distance from the average horizontal level surface of the rock toe to the measuring point. The dashed error bars indicate the averaged standard error of the first order Fourier fit for each ADV and measuring position.

Typically the figures show that the velocity measurements for the larger armour rocks (ADVx1 with rock armour Dn50=0.035m) are marginally higher than for the smaller rock amour (ADVx2 with Dn50=0.025m), and both are marginally higher than the theoretical results for velocity using linear wave theory in shallow water (U0).

Further, on most plots a minor magnitude variation in maximum horizontal velocity is visible across the toe in a regular type distribution for both velocity probes (i.e. no major discontinuities present, not highly irregular across x direction).

It seems that for plots with a high water level to wave height ratio (Hs/Hm greater than 0.3) the velocity profile varies more and has a bigger difference between adjacent velocity positions than for low ratios. The plots with a low water to wave height ratio appear to have a ‘flatter’ velocity profile.

The location of the maximum velocity point in the distribution profile varied and no distinct pattern or trend has been identified in its location.

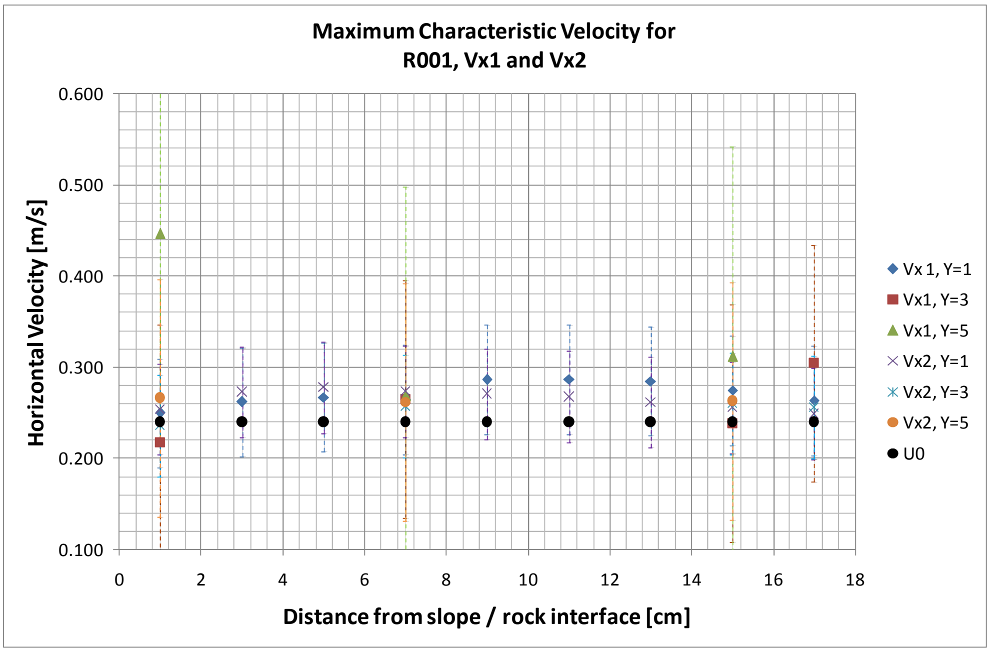


FIGURE 16 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R001

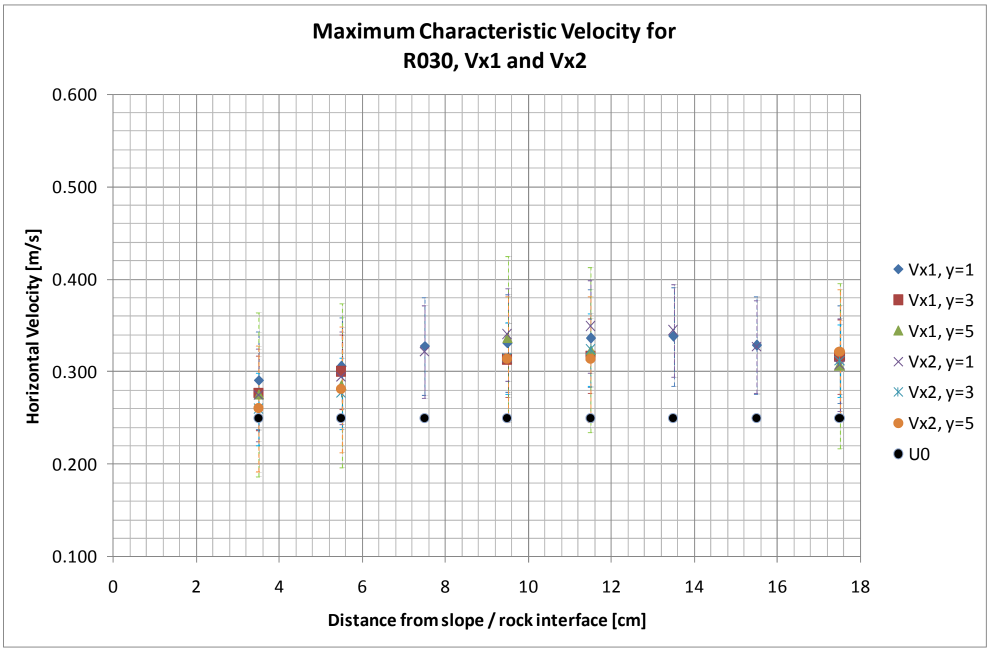


FIGURE 17 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R030

### 5.1.5 ANALYSIS OF CHARACTERISTIC LOCAL HORIZONTAL VELOCITY

The fitted measured maximum velocities derived in section 5.1.4. have been plotted against the theoretical linear shallow water maximum velocity at various locations along the breakwater toe to compare them. The figures are all formatted to the same linear scale and placed next to each other on the following three pages to facilitate comparison between them.

The plots shown in Figure 18 to Figure 23 indicate that for each water level and toe height a distinct pattern emerges which appears somewhat independent of the location from the toe along x and y.

The effect of the various positions of x and y appear result in a 'spread' of the graphs rather than changing the actual shape. The spread between the results for various locations x and y appears to be larger for the higher toe level than for the lower toe level which is shown in Figure 22 compared to Figure 18, however the number of tests is too small to come to a definitive conclusion on this.

Further, a similar shape pattern is achieved for both stone diameters i.e. ADVx1 and ADVx2, however the magnitude of the ADVx1 (the larger rock with Dn50=0.035m) pattern is generally higher. Refer to Figure 18 and Figure 19 which display similarity in shape, both figures show the characteristic maximum velocity versus the maximum linear velocity for the same geometric and loading conditions but different rock sizes.

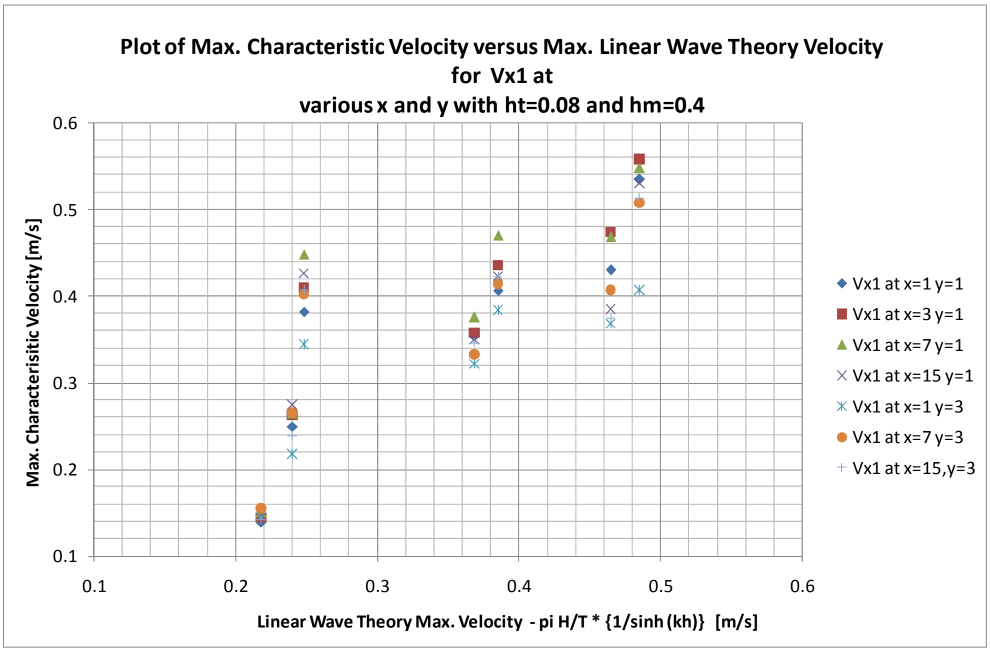


FIGURE 18 - MAX. MEASURED VELOCITY VERSUS LINEAR VELOCITY FOR HT=0.08M AND HM=0.4M FOR ADVX1

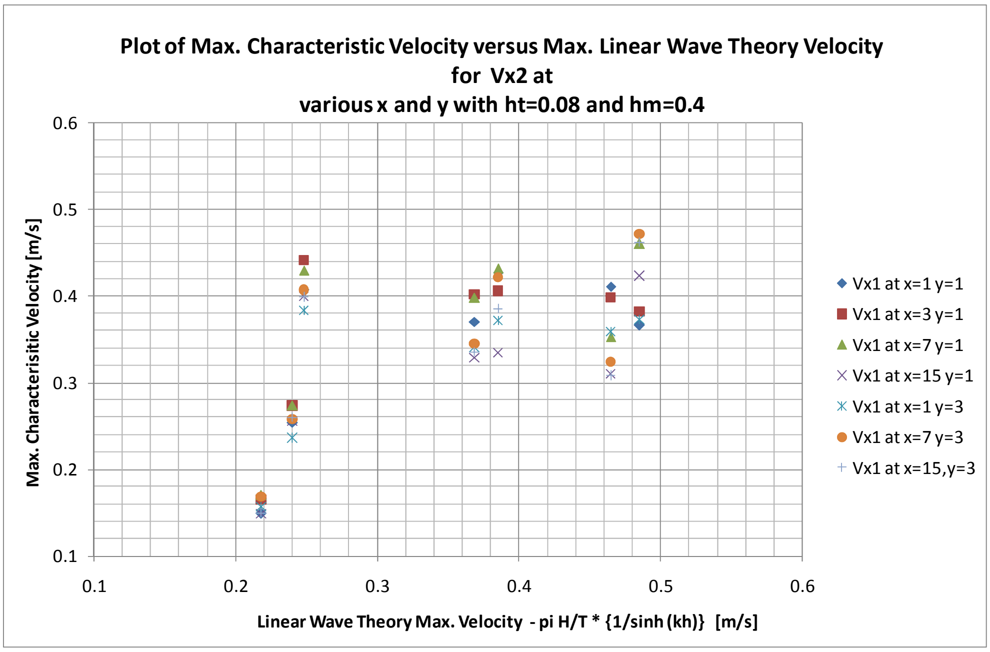


FIGURE 19 - MAX. MEASURED VELOCITY VERSUS LINEAR VELOCITY FOR HT=0.08M AND HM=0.4M FOR ADVX2

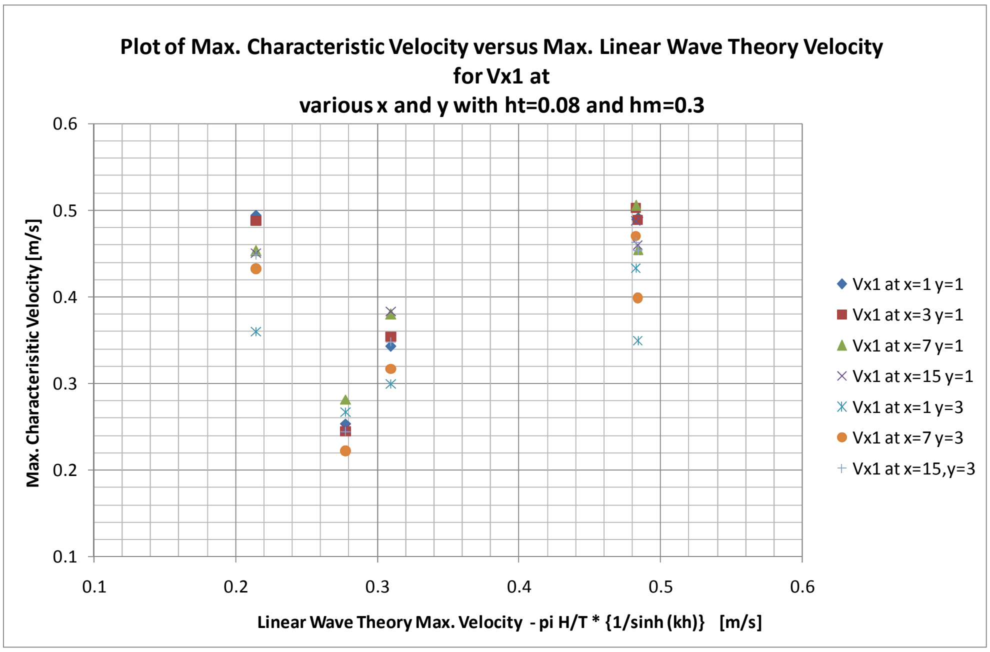


FIGURE 20- MAX. MEASURED VELOCITY VERSUS LINEAR VELOCITY FOR HT=0.08M AND HM=0.3M

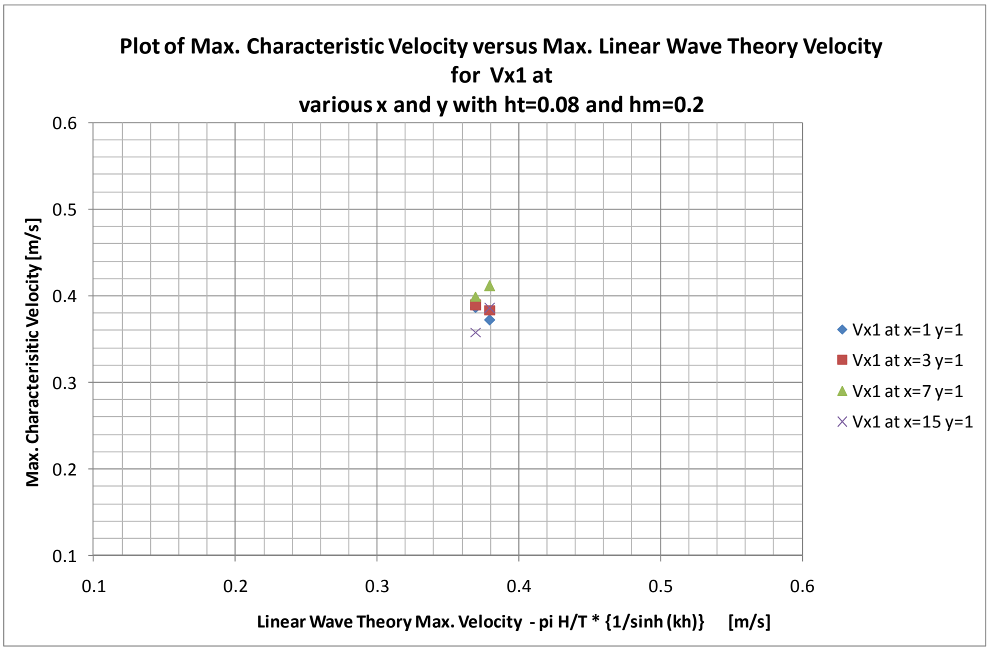


FIGURE 21 - MAX. MEASURED VELOCITY VERSUS LINEAR VELOCITY FOR HT=0.08M AND HM=0.2M

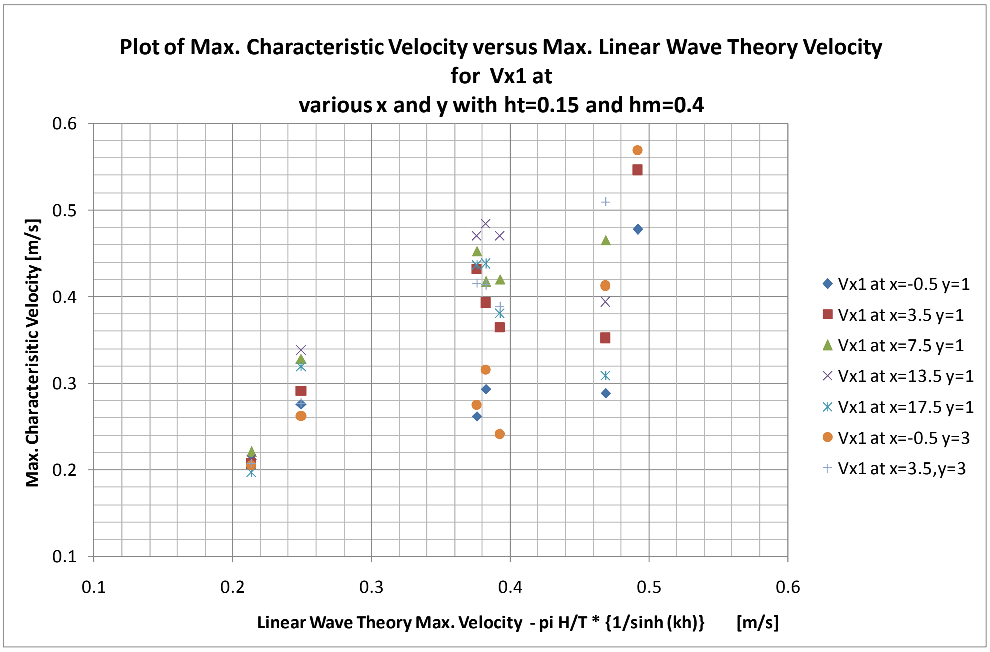


FIGURE 22 - MAX. MEASURED VELOCITY VERSUS LINEAR VELOCITY FOR HT=0.15M AND HM=0.4M

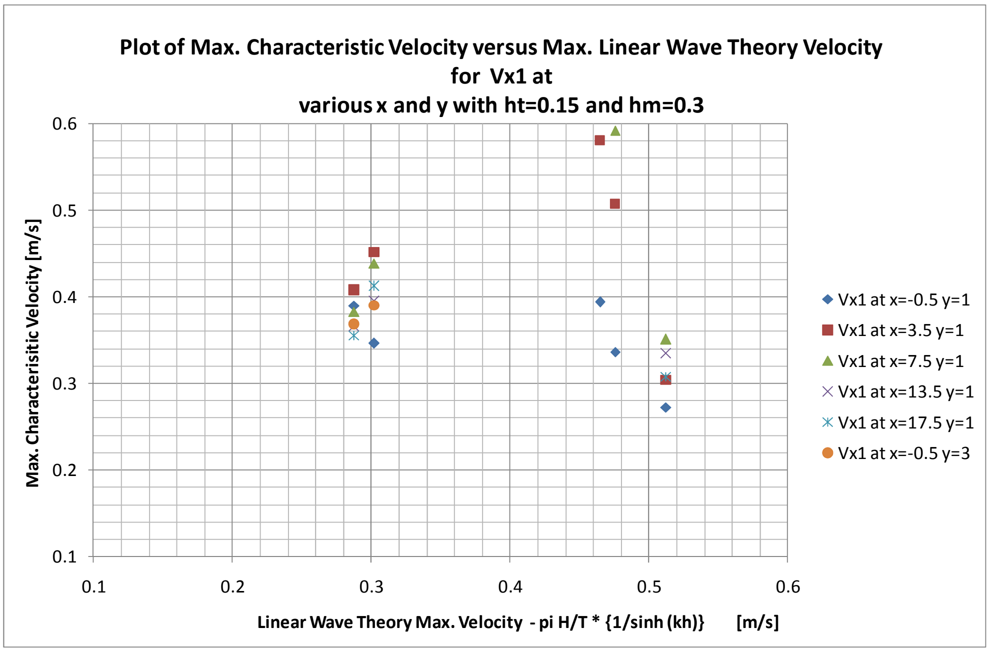


FIGURE 23 - MAX. MEASURED VELOCITY VERSUS LINEAR VELOCITY FOR HT=0.15M AND HM=0.3M

## Development of adimensional empirical relationships

Plots of adimensionalised maximum velocity versus adimensionalised toe and water level (ht/ hm) have been undertaken for both rock sizes to determine if a 'generic' shape or relationship can be determined for any water level (hm). It was hoped that this would simplify the general shapes found in the previous plots.

The adimensionalised plots, refer to Figure 24 and Figure 25 appear to be showing a typical shape, a line with a step change or a straight line with scatter or two straight lines, for each wave height and wave period combination for both stone diameters (i.e. ADVx1 and ADVx2. The error bars show the standard error of the Fourier fit adimensionalised with respect to the linear wave theory shallow water velocity. The band width of the error and the spread between the individual sets of data points makes a determination of a simple linear formulation or description difficult.

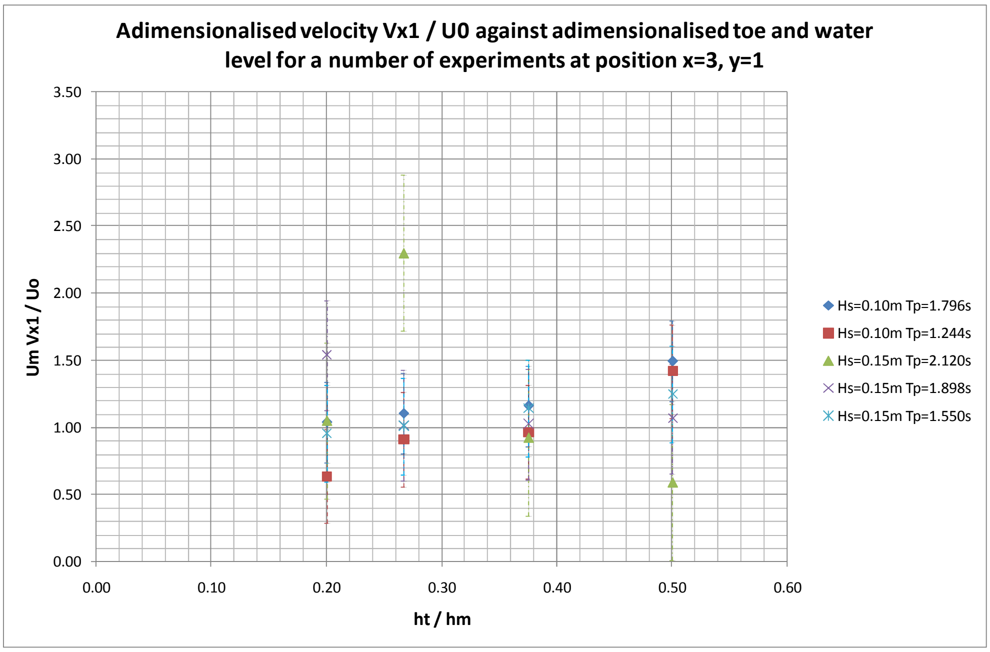


FIGURE 24 - ADIM. VELOCITY VX1 VERSUS TOE AND WATER LEVEL FOR VARIOUS WAVE HEIGHTS AND PERIODS

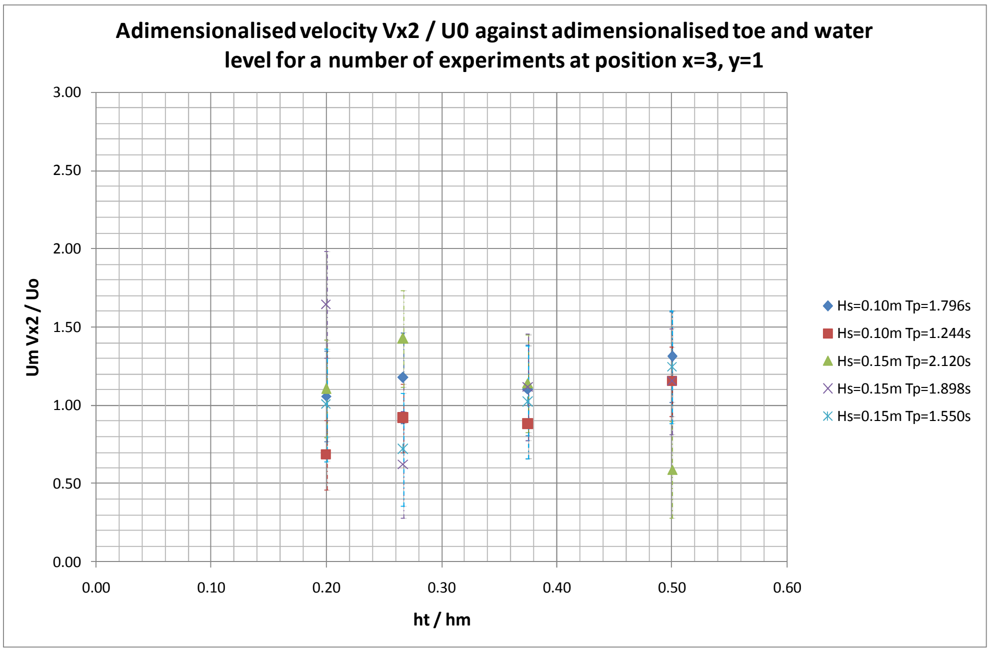


FIGURE 25 - ADIM. VELOCITY VX2 VERSUS TOE AND WATER LEVEL FOR VARIOUS WAVE HEIGHTS AND PERIODS

A further plot has been undertaken in order to reduce the spread between the sets of data points to enable a simple linear description of the data.

In this plot fictitious wave steepness has been included in the x-axis in order to be able to correlate to the Iribarren number. The Iribarren number represents the physical behavior of waves and would allow later researchers undertaking similar tests to include slope comparisons.

This new plot appears to be reducing the spread of the individual points, however significant scatter is still present. A linear trendline of the standard form shown in Equation 6 shows that the larger rock armour of Dn50=0.035m has a slope factor m of 0.017 and a coefficient of 1.105. For the smaller rock armour, Dn50=0.25, the results are similar with a slope factor of 0.015 and a coefficient of 1.034. However, the error bars are significant which raises the doubt on the reliability of these values. Please refer to Figure 26 and Figure 27 on the next page.

EQUATION 6 $\boldsymbol{y = mx + a}$

EQUATION 7 $\boldsymbol{U_{max} = U_0\left\{m\frac{1}{\sqrt{s}}\left[\frac{h_t}{h_m}\right] + a\right\}}$

EQUATION 8 $\boldsymbol{\xi = \frac{\tan(\alpha)}{\sqrt{s}}}$

EQUATION 9 $\boldsymbol{U_{max} = U_0\left\{m\xi\left[\frac{h_t}{h_m}\right] + a\right\}}$

Where $\boldsymbol{\alpha}$ is the angle of the slope

s is the fictitious wave steepness $\boldsymbol{s = \frac{2\pi H}{gT^2}}$

$h_t$ is the toe height

$h_m$ is the water level at the toe

$\xi$ is the Iribarren number

$U_0$ is defined as $U_0 = \frac{\pi H_0}{T}\frac{1}{\sinh(k[hm - ht])}$

**Final Comments**

The results should be considered preliminary as the number of tests is insufficient to come to a definitive conclusion on empirical relationships and linear coefficient values. Significant more research is required to validate the above formulation. In further research the effect of the slope could be considered using the form of Equation 9.

Finally, it may be argued that in the Fourier curve fitting process, data was reduced and potentially some peaks may have been lost resulting in a reduced overall characteristic velocity. However, since the velocity is considered ‘characteristic’ and will be linked to actual armour movements in a two step model an absolute value is probably not necessary.

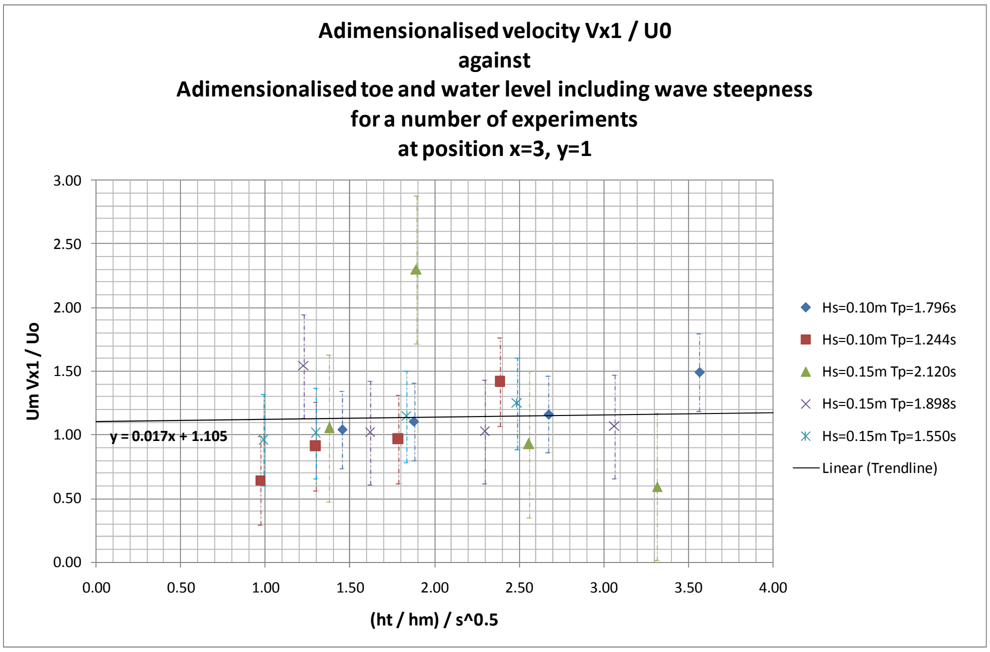


FIGURE 26 ADIMENSIONALISED VELOCITY PLOT FOR VX1

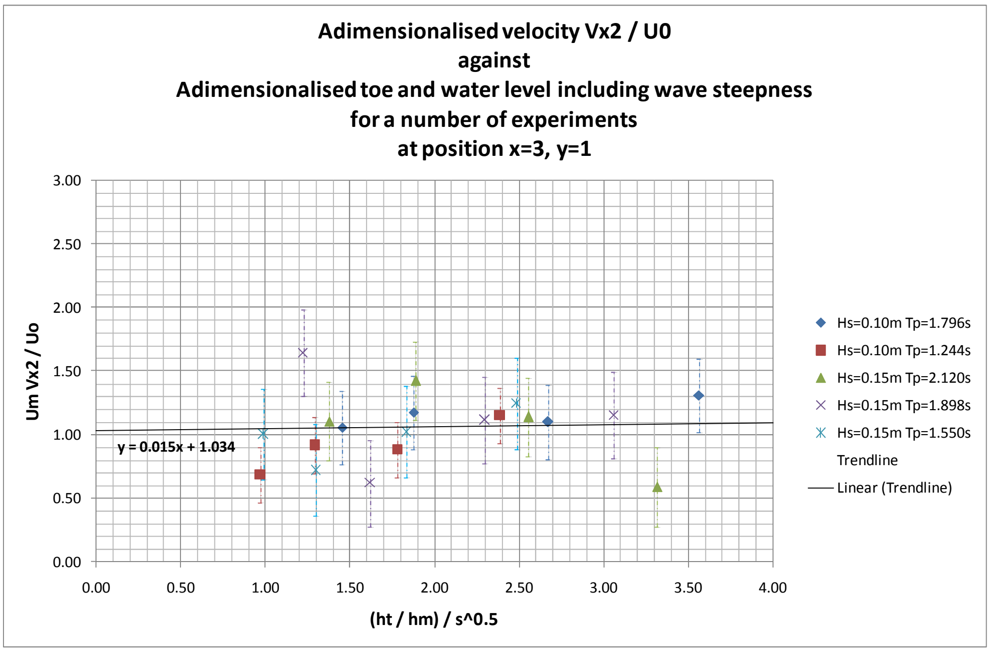


FIGURE 27 - ADIMENSIONALISED VELOCITY PLOT FOR VX2

### 5.1.6 VERTICAL AND LATERAL VELOCITY COMPONENTS

No analysis of vertical and lateral velocity components has been undertaken due to time constraints. Recordings of those directions are available for analysis by others. However, caution should be exercised with these measurement results as the ADV1 has previously produced erroneous results for the beam 3. Further, a previous researcher using the ADV for velocity measurements has noted that the accuracy of the vertical velocity components is less and in some instances large errors are noted.

## 5.2 IRREGULAR WAVES

The irregular test data has not been reviewed or analysed due to time constraints and a number of associated difficulties inherent in the data collection and data analysis and hence these results are not presented in this report. The difficulties are briefly elaborated below.

### 5.2.1 IRREGULAR WAVES - DATA COLLECTION PROBLEMS

During and after recording the input significant wave height was verified against measured wave heights and generally large discrepancies were found, waves were typically significantly smaller than programmed/ scheduled.

It is believed that this is due to difficulties by the wave generator and compensator who were found to have a too short piston to cope with larger waves and large wave reflection. A couple of the tests were re-run again with higher wave settings than those in the testing schedule to compensate the overall lower output, but the generator tended to fail. Due to the problems with the generator in compensating reflecting waves no guarantee can be given that the input load characteristic are conform with a Jonswap spectrum at a given wave height and care needs to be taken when analyzing the data.

### 5.2.2 IRREGULAR WAVES - DATA ANALYSIS PROBLEMS

It is believed that the analysis method employed for the regular waves will not be applicable for the irregular wave tests due to their nonlinear nature. A spectral type approach or similar would be a possibility in analyzing the data and could lead to a characteristic maximum velocity.

Further, a decision will have to be made on the nature and definition of the characteristic velocity as there is no simple re-occurring maximum that can be statistically averaged. The wave loading characteristics change continuously for irregular waves and no repeat of the exact same conditions occurs. Therefore, should one use for example the mean of the 10% largest velocity contributions when ranked in order for each load and geometry combination as a characteristic velocity or any other reasonable value such a 5%, the mode rather than the mean etc? The choices in defining a characteristic velocity will invariably be somewhat arbitrary and open to discussion. A consequence of any arbitrary definition of characteristic velocity is that the results and formulations for the regular and irregular tests are not strictly comparable.

# 6.0 CONCLUSION

## 6.1 INTRODUCTION AND OBJECTIVE

This short research report presents data from a number of regular wave tests undertaken at the TU Delft to assist in the understanding of flow velocity at rubble mound breakwater toes. The particular objective of the study is to assist in the development of a physical parameterization model which links load, geometry and local velocity in a first step as part of a two step model approach to parameterize toe stability under wave action.

## 6.2 LABORATORY WORK AND EXPERIMENT

Laboratory testing in combination with empirical curve fitting has been chosen to develop a better understanding of the physical processes and the impact of parameters. An experiment has been set up as similar as possible to that of a previous researcher, Gerding, who has undertaken damage level tests at breakwater toes in 1993 to enable correlation of results at a later stage. Due to the short time period available for the testing only a limited number of load and geometry parameters were varied whilst the local velocity was measured by two Acoustic Doppler Velocimeters (ADVs) at regularly geometric intervals. The most important key parameters of the experiment are listed in the Table 8 below.

**TABLE 8 - KEY PARAMETERS**

| Water level | Wave Height | Steepness | Toe Height | Rock Size | Toe Width | Foreshore slope | Rock Slope |
|---|---|---|---|---|---|---|---|
| hm [m] | Hs [m] | s | ht [m] | Dn50 [m] | bt [m] | | |
| • 0.4<br>• 0.3<br>• 0.2 | • 0.1<br>• 0.15<br>• 0.2 | • 0.02<br>• 0.04 | • 0.08<br>• 0.15 | • 0.035<br>• 0.025 | 0.12 | 1:20 | 1:1.5 |

## 6.3 RESULTS

An analysis of the measurements revealed that the horizontal wave velocity has the same period as the wave. However the local water level and velocity are not having a constant phase relationships in space (along the toe) and most likely not in time (crest versus trough).

For low breaker indices (water level to wave height ratios less than 0.3) the phase difference appears small, for large breaker indices (> 0.3) the phase difference typically increases. In addition, between the trough of the wave and the mean surface water level, a significant additional velocity component is visible on the Lissajous type plot. This additional velocity component is most likely down rush. It is difficult to determine whether a predominant phase shift and/ or an amplitude increase takes place at those instances. It may be a possibility to study this phenomenon further to validate Baart's proposed velocity formulation. However, it is expected that it will be difficult to separate the down rush component from wave orbital motion.

Increasing the wave period increases the phase difference between the local water level and velocity. Increasing the toe height has a marginal influence on the phase and the shape of Lissajous plots remains essentially the same. The rock size appears to have no to a negligible effect on the phase difference.

Curve fitting has been deployed to develop an empirical formulation linking the perceived key characteristics in a linear relationship which is presented in Equation 9 below. The data indicates that the linear slope coefficient is 0.017 and 0.015 and the linear y-intercept coefficient is 1.105 and 1.034 for a rock size Dn50 of 0.035m and 0.025m respectively. Further studies are required to confirm the formulation as the data has a significant error bands and scatter. A notable advantage of the Equation 7 is that it can be adjusted to form Equation 9 to incorporate slopes should further research be carried out.

**EQUATION 7**
$$\boldsymbol{U_{max} = U_0\left\{m\frac{1}{\sqrt{s}}\left[\frac{h_t}{h_m}\right] + a\right\}}$$

**EQUATION 9**
$$\boldsymbol{U_{max} = U_0\left\{m\xi\left[\frac{h_t}{h_m}\right] + a\right\}}$$

| | | |
|---|---|---|
| Where | a | is a linear coefficient for the y-intercept |
| | m | is a linear slope coefficient |
| | s | is the wave steepness |
| | $h_t$ | is the toe height |
| | $h_m$ | is the water level at the toe |
| | $\xi$ | is the Iribarren number |
| | $U_0$ | is defined as $U_0 = \frac{\pi H_0}{T}\frac{1}{\sinh\left(k[hm - ht]\right)}$ |

## 6.4 FURTHER WORK

Further studies are required to validate the results of the tests and the parameterization formulation chosen due to the limited number of tests in the study and the significant error bands.

In addition, the regular vertical velocity component as well as irregular wave induced characteristic velocities should be studied further to develop an effective understanding of toe velocities.

# 8.0 LIST OF SYMBOLS

| Symbol | Definition | [units] |
|---|---|---|
| $\alpha$ | is the angle of the slope | [RAD] |
| $\mathbf{a_0}$ | is a Fourier fit coefficient (constant) | [-] |
| $\mathbf{a_1}$ | is a Fourier fit coefficient (cos) | [-] |
| a | is a linear constant for the y-intercept | [-] |
| $b_1$ | is a Fourier fit coefficient (sin) | [-] |
| $b_t$ | Width of breakwater toe structure | [m] |
| Dn50 | Median Nominal stone diameter | [m] |
| g | is gravity ≈9.81 | [$ms^{-2}$] |
| $h_m$ | is the water level at the toe | [m] |
| $h_t$ | is the toe height | [m] |
| $H$ | is the wave height | [m] |
| $H_{m01}$ | is the significant wave height based on spectral moments | [m] |
| $H_s$ | is the significant wave height based on visual observations | [m] |
| $k$ | is the wave number $k = \frac{2\pi}{L}$ | [1/m] |
| m | is a linear slope coefficient | [-] |
| $\boldsymbol{\omega}$ | is the wave angular frequency $(\boldsymbol{2\pi/T})$ | [rad/s] |
| $\varphi_{TA}$ | is is the phase lag between the down rush and incoming wave | [rad] |
| $\varphi$ | is the phase lag between the run-up and resulting velocity | [rad] |
| v | Kinematic Viscosity of fluid | [$m^{-2}\cdot s^{-1}$] |
| s | is the fictitious wave steepness $\boldsymbol{s = \frac{2\pi H}{gT^2}}$ | [-] |
| $T$ | is the wave period | [s] |
| $t$ | is time | [s] |
| $u$ | is the horizontal wave component of orbital velocity | [m/s] |

| **Symbol** | **Definition** | **[units]** |
|---|---|---|
| $\hat{u}_{bi}$ | is the velocity of the incoming wave | [m/s] |
| $\hat{u}_{bdr}$ | is the velocity due to the downrush | [m/s] |
| $U_{fitted}$ | is the Fourier fitted velocity | [m/s] |
| $U_{fitted\ max}$ | is the maximum amplitude of the Fourier fitted velocity | [m/s] |
| $U_0$ | is defined as $U_0 = \frac{\pi H_0}{T}\frac{1}{\sinh\left(k[hm-ht]\right)}$ | [m/s] |
| $x$ | is the horizontal distance in direction of the wave | [m] |
| X | is the horizontal distance from the toe rock/slope interface | [m] |
| Y | is the vertical distance from the toe surface | [m] |
| $\xi$ | is the Iribarren number | [-] |

# 9.0 REFERENCES

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VAN DER MEER (1998) Geometrical design of coastal structures, Infram Publication no.2 (www.infram.nl)

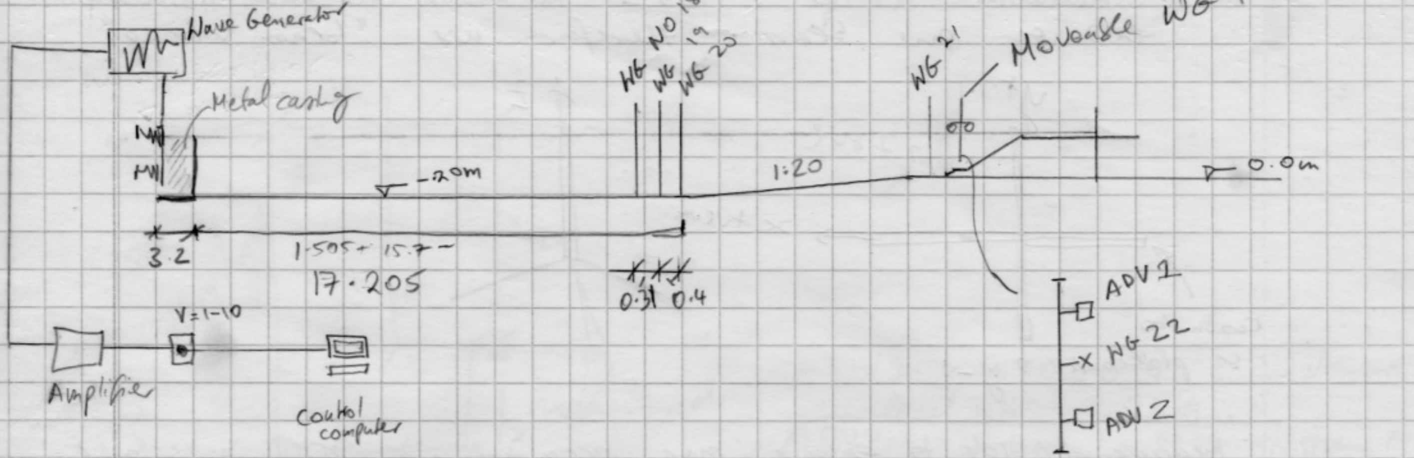
# APPENDIX A – EXTRACTS FROM LAB LOG BOOK

# APPENDIX B – TABLES OF RESULTS

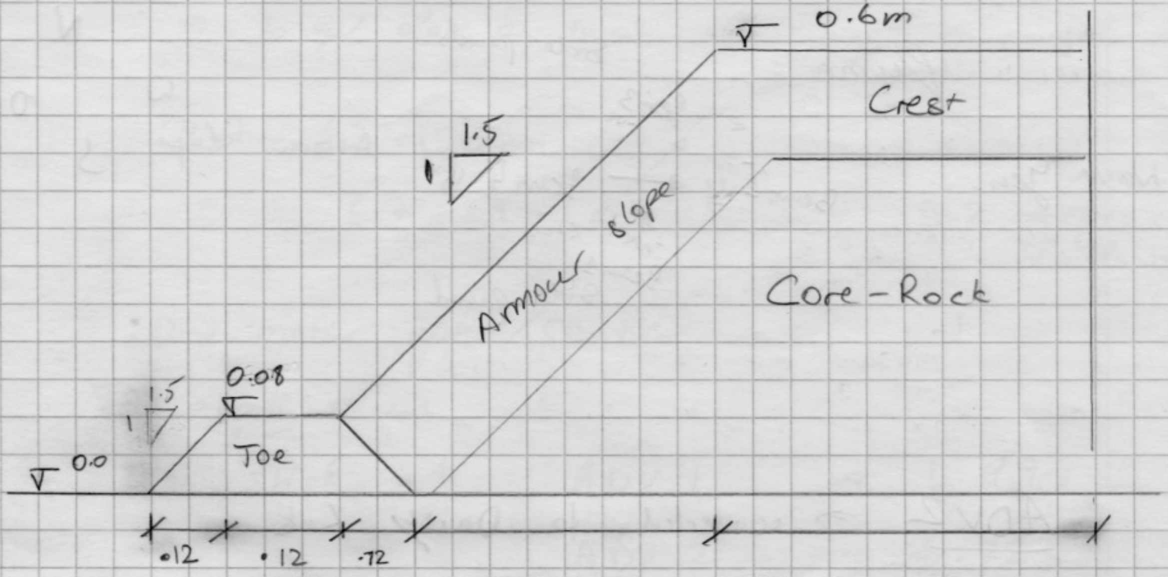
# APPENDIX C – LISSAJOUS PLOTS

# APPENDIX D– MAXIMUM VELOCITY DISTRIBUTION PLOTS

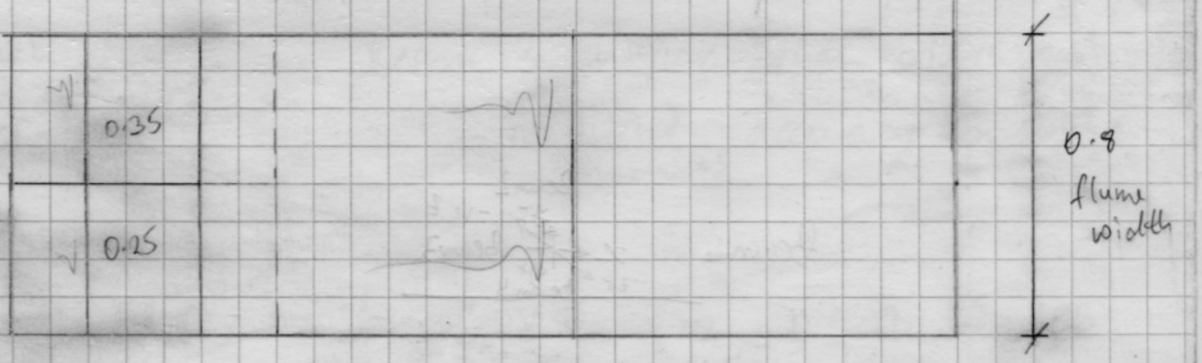
# Experimental Set-up



## Detail on Rock armour slope
## X-Section



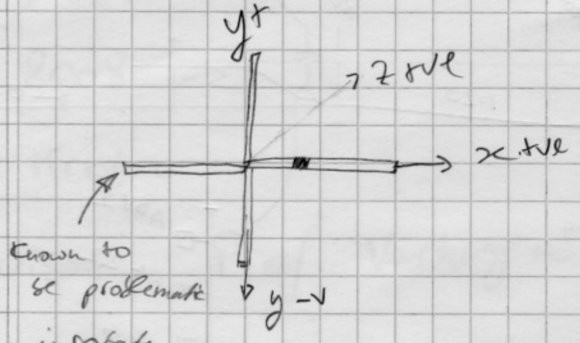
Plan view

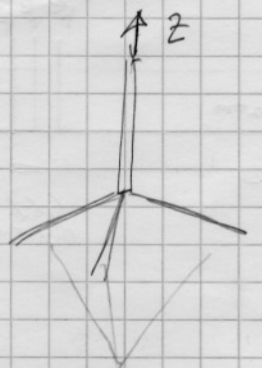


toe split into two halves 0.35 & 0.25

armour rock 0.4m → see excel file for details

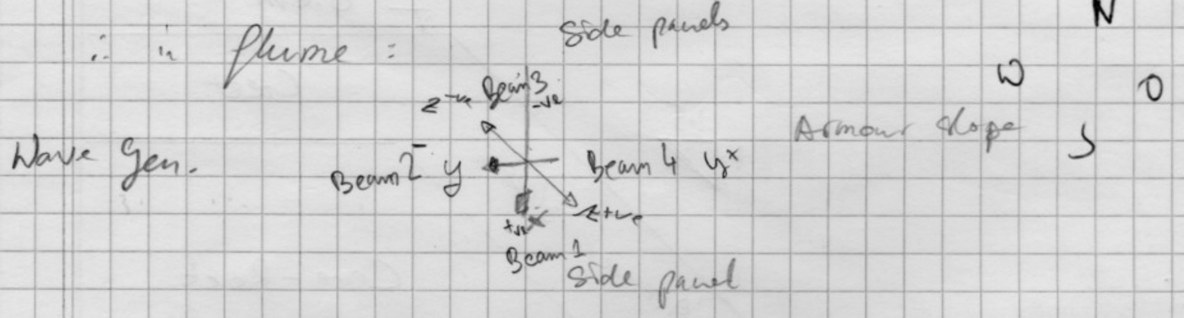
Instrumental set-up ADV 1 is known to have instrumentation error on one beam → therefore use "beam set-up"



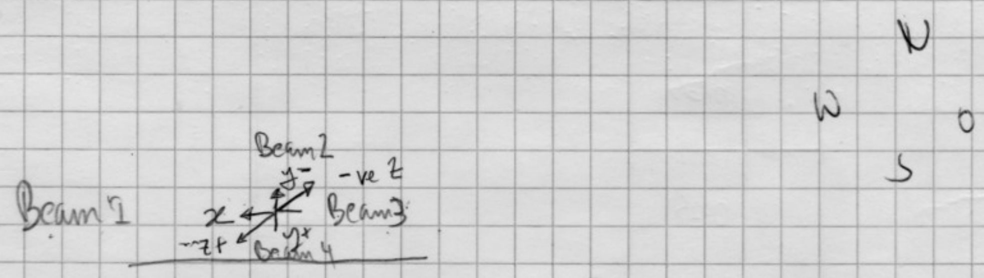


∴ rotate measurement prob to ensure max. accuracy & most important flow

∴ in flume :

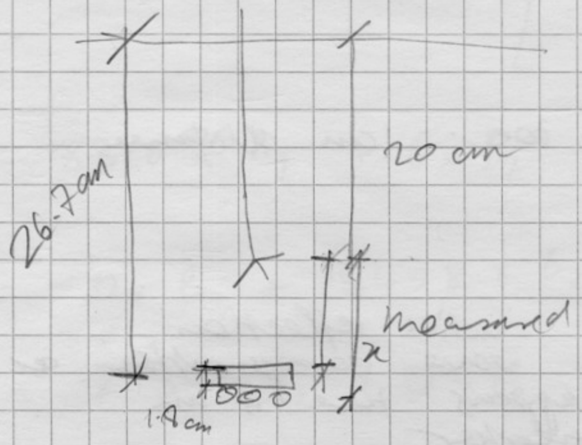


ADV 2 → connected to Daisy Lab



VX

Test Vectrino height



ADV1 → meas. 6.7 ; instrument 6.8
level stick 1.957

ADV2 → meas. 6.5 ; instrument 6.6
level stick 4.69

→ to get close to rock :

26.7 - 6.7 = 20 cm

6.7 + 1.8 = 8.5

want 5.2 approx
3.3cm to be lowered

Dist. meter off / scatter

For experiment use

Dist. stick at ADV 1 → 1.990

ADV 2 → 4.723

check profile + Beam 3 higher than others
+ limited accuracy on soft machines

final position

ADV I → 1.~~990~~ 993

ADV 2 → 4.720

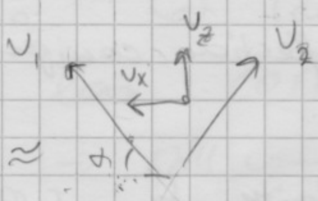
This means beam at 5.5cm height from bed

✓

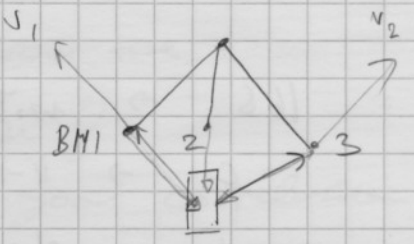
Check output in Dasy

0 – 5V ; Analogue output ± 0·3ms⁻¹

2.5V = 0



14° ≈



$$V_1 = V_x \cdot \sin(\alpha) + V_z \cdot \cos\alpha$$

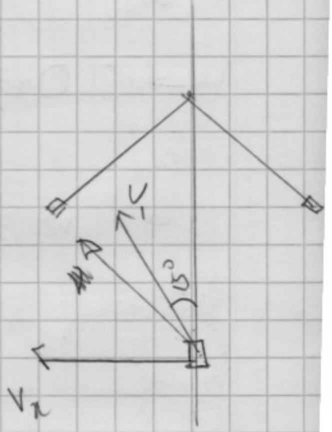
$V_2 =$

etc.

$$\left.\right\} \quad V_x = \frac{V_1 - V_2}{2 \overset{\sin}{\cos}\alpha}$$

$V_z =$

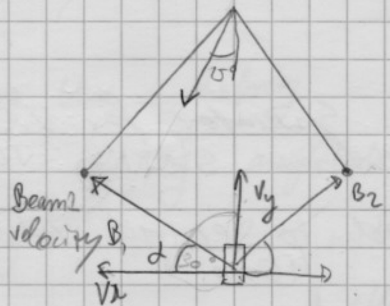
$$\begin{bmatrix} V_x \\ V_y \\ V_z \\ V_{error} \end{bmatrix} = \overset{4\times4}{M} \cdot \overset{4\times1}{\begin{bmatrix} V_1 \\ V_2 \\ V_3 \\ V_4 \end{bmatrix}}$$



$B_1 = V_x \sin\alpha_1 + V$

$B_3 = -V_x \sin\alpha_3 +$

$B_1 - B_3$



$\alpha = 15°$

$B_1$ : x $B_1 \cos\alpha$

y : $B_1 \sin\alpha$

$B_2$ : x $B_2 \cos\alpha$

$B_1 = V_1 \; B_2 \sin\alpha$

$B_2 = -V_x \cos\alpha + V_y \sin\alpha$

$$\left.\begin{aligned} V_1 &= V_{x1} \cos\alpha + V_z \sin\alpha \\ V_2 &= -V_{x2} \cos\alpha + V_z \sin\alpha \end{aligned}\right\} \quad \begin{aligned} V_1 - V_2 &= V_x \cos\alpha + \\ V_x &= \frac{V_1 - V_2}{2\cos\alpha} \end{aligned}$$

$\Rightarrow V_x = B_1 \cos\alpha - B_2 \cos\alpha$

col. 3 → 4

$V_z = (B_1 + B_2) \sin\alpha$

✓

$$ADV1 \begin{bmatrix} 8318 & 0 & -8329 & 0 \\ 0 & 8458 & 0 & -8494 \\ 2134 & 0 & 2091 & 0 \\ 0 & 2182 & 0 & 2038 \end{bmatrix} \begin{bmatrix} B_1 \\ B_2 \\ B_3 \\ B_4 \end{bmatrix} = \begin{matrix} V_1 \\ V_2 \\ V_3 \\ V_4 \end{matrix}$$

$$V_1 = 8318 \times B_1 + 0 \times B_2 + (-8329) \times (B_3) + 0 \times B_4$$

$$V_2 = 0 \times B_1 + 8458 \times B_2 + 0 \times B_3 + -8494 \times B_4$$

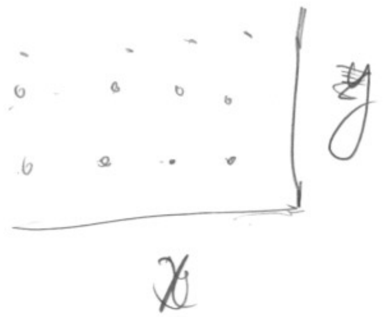
$$V_3 = 2134 \times B_1 + 0 \times B_2 + 2091 \times B_3 + 0 \times B_4$$

$$V_4 = 0 \times B_1 + 2182 \times B_2 + 0 \times B_3 + 2038 \times B_4$$

$$\Rightarrow V_1 = \frac{8318}{4096} B_1 - \frac{8329}{4096} B_3$$

$$= 2.0307 B_1 - 2.03347$$

$$ADV2 = \begin{bmatrix} 8161 & 0 & -8165 & 0 \\ 0 & 8425 & 0 & -8362 \\ 2122 & 0 & 2108 & 0 \\ 0 & 1986 & 0 & 2236 \end{bmatrix}$$



$$V_1 = 8161 \times B_1 - 8165 \times B_3$$

$$V_2 = 8425 \times B_2 - 8362 \times B_4$$

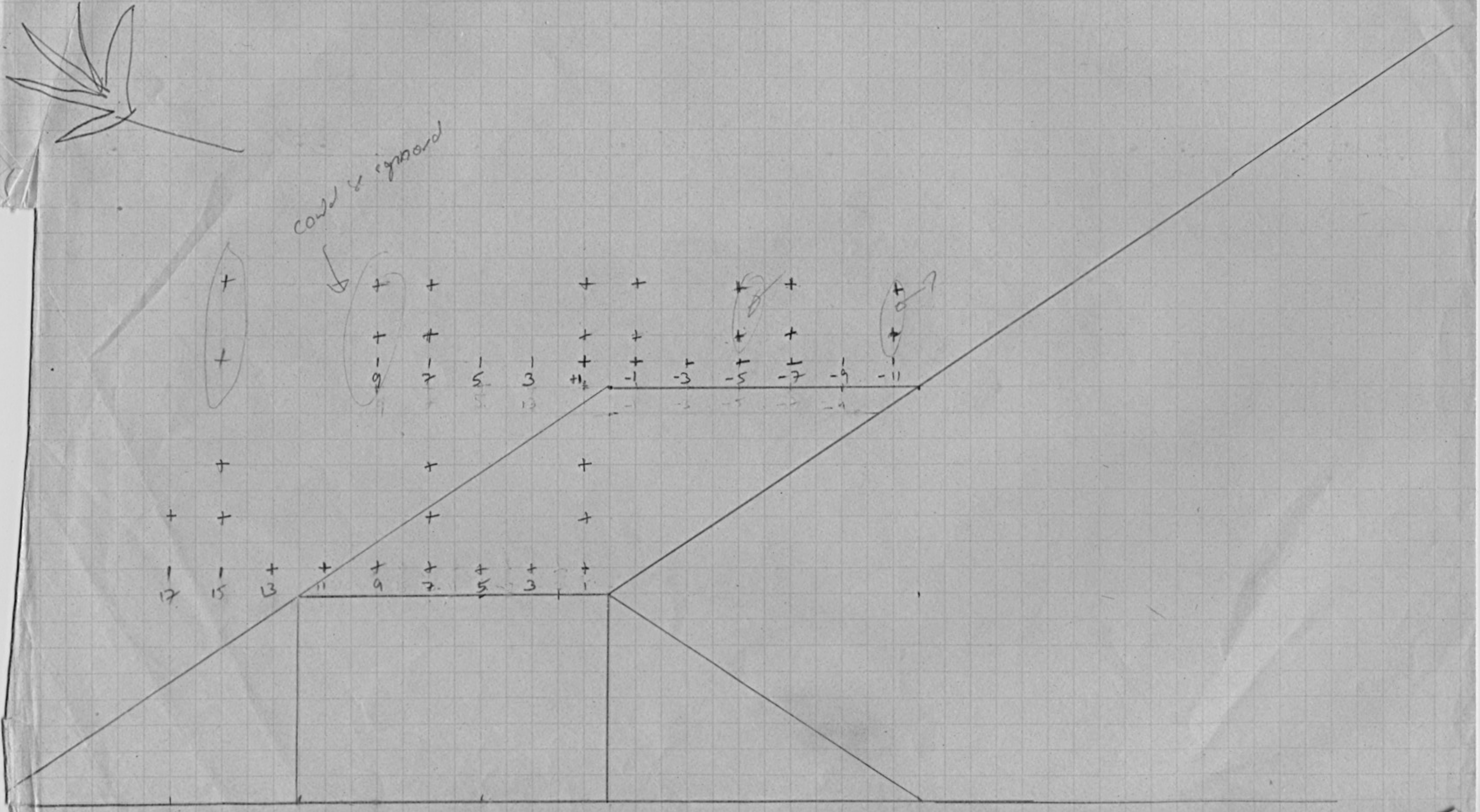
$$V_3 = 2122 \times B_1 + 2108 \times B_3$$

$$V_4 = 1986 \times B_2 + 2236 \times B_4$$

gmargelowsky@yahoo.com

Singapore Views 7

could b ignored



✓ Steering Files

R001. → $h_m = 0.4$ ; $H = 0.1$ ; $T = 1.790s$ $(s = 0.02)$

R002 → $h_m = 0.4$ ; $H = 0.1$ ; $T = 1.265 s$ $(s = 0.04$

R003 → $h_m = 04$ ; $H = 0.15$ ; $T = 2.197$ $(s = 0.02)$

R004 → $h_m = 0.4$ ; $H = 0.15$ ; $T = 1.898$

✓

Friday 6th June 08

Data trigger changes experimental time !

Redo Experiments with Wave comp. repaired & on

**R003**

all at 0 height i.e

1cm from Rock

Test 1 → $h_m = 0.4$ ; $H = 0.15$ ; $T = 2.197$ ; Duration = 300s
@ 1cm

Test 1.a → " – " but duration 60s

b. → Same set-up check timer

Test 2 → @ 7cm from toe

Test 3 → @ 5cm from toe

Test 4 → @ 3cm from toe

Test 5 → @ 9cm from toe

Test 6 → @ 11cm from toe

Test 7 → @ 13cm from toe

Test 8 → @ 15cm from toe ← don't check below

Test 9 → @ 17cm from toe ←

ADV 2 at level = 372.5

ADV 1 at level = 199.4

---

3cm From Rock

move ADV's by 2cm up to ADV2 370.5
ADV 1 197.4

Test 10 → @ 17cm from toe

Test 11 → @ 15cm from toe

12 → @ 13cm from toe

13 → @ 11cm from toe

14 → @ 9cm from toe

15 → @ 7cm from toe

16 → @ 5cm from toe

17 → @ 3cm from toe

18 → @ 1cm from toe

✓ Move ADU's up 2cm

**R.E.Ebbens@student.tudelft**

to ADU2 at 468.5
ADU1 at 195.4

Test 19 @ 1cm from toe
Test 20 @ 3cm from toe
Test 21 @ 5cm from toe
Test 22 @ 7cm from toe
Test 23 @ 9cm from toe
Test 24 @ 11cm from toe
Test 25 @ 13 cm from toe
Test 26 @ 15 cm from toe
Test 27 @ 17 cm from toe

5 cm from ~~toe~~ roce

Run-up : 13cm
Run-down : 7.5 cm

move ADU2 to 466.5
ADV 1 to 193.4

Test 28 @ 17cm from toe
Test 29 @ 15cm from toe
Test 30 @ 13cm from toe
Test 31 @ 11 cm from toe
Test 32 @ 9cm from toe
Test 33 @ 7cm from toe
Test 34 @ 5cm from toe
Test 35 @ 3cm from toe
Test 36 @ 1cm from toe

→ Monday 9th Jun

7 cm from roce

mean vx1 ; location [x y]
mean vx2

✓

to ADV2 @ 464.5
ADV 1 @ 191.4

test 37 @ 1 cm from toe
38 @ 3 cm from toe
39 @ 5 cm from toe
40 @ 7cm from toe
41 @ 9cm from toe
42 @ 11 cm from toe
43 @ 13 cm from toe
44 @ 15 cm from toe
45 @ 17 cm from toe

} 9 cm from rock

to ADV 2 @ 462.5
1 189.4

46 @ 17cm from toe
47 @ 15 cm from toe
48 @ 13cm from toe
49 @ 11 cm from toe
50 @ 9 cm from toe
51 @ 7cm from toe
52 @ 5cm from toe

Shut down & restart to have [illegible] measurements v4.DSB

53 @ 3 cm from toe
54 @ 1cm from toe

} 11 cm from rock

---

move ADV2 — 2 460.5
ADV1 — 1874

55 @ 1cm from toe + removed header
56 @ 7cm from toe
57 @ 15 cm from toe

} 13 cm from rock

✓ move ADV 1 185.4
ADV 2 458.5

58 @ 15 cm from toe
59 @ 7 cm from toe
60 @ 1 cm from toe

15 cm from rock

move ADV2 456.5
ADV1 183.4

61 @ 1 cm from toe
62 @ 7cm from toe
63 @ 15cm from toe

17 cm from rock

Test concluded !

Done Dye test !

---

→ Change Wave height. <u>Redo R001</u>

but with wave comp!

ADV2 → 472.5
ADV1 → 199.4

R001 → H = 0.1 ; T = 1.79 s

start

1cm from Rock

Test 1 @ 1 cm from toe at 1 cm above
Test 2 @ 3 cm from toe
Test 3 @ 5cm
Test 4 @ 7cm
Test 5 @ 9cm
Test 6 @ 11 cm
Test 7 @ 13 cm
Test 8 @ 15 cm
Test 9 @ 17cm

<u>Done Dye test</u>

Run-up 6cm
Run-down 6cm

move ADV to 2 cm up to ADV 2 370.5
ADV 1 197.4

✓

3 cm from rock
Test 10 = @ 17 cm from toe height 3
Can handle heights free for [illegible] again !
Test 11 @ 15 cm from toe
Test 12 @ 7 cm from toe
Test 13 @ 1cm from toe

5cm from rock
Test 14 @ 1cm from toe move to height 5cm

| | |
|---|---|
| ADV 2 | 368.5 |
| ADV 1 | 195.4 |

switch on channel names
Test 15 @ 7 cm from toe
Test 16 @ 15 cm from toe

— Done for the day

Tuesday 10th June 08

Re-do calibration to see if any changes ; Done

Prep. Redo R002 ; Run probe check to see all OK

| | |
|---|---|
| ADV 2 | 372.5 |
| ADV 1 | 199.4 |

} both measure 1cm from bed

1 cm from rock
Test 1 @ 1cm from toe at height 1 cm
Test 2 @ 3 cm from toe
Test 3 @ 5 cm from toe
Test 4 @ 7 cm from toe
Test 5 @ 9cm from toe
Test 6 @ 11 cm from toe
Test 7 @ 13 cm from toe

Run-up : 5 cm
Run-down : 4.5 cm

Test 8 @ 15 cm from toe
Test 9 @ 17 cm from toe

✓

3cm from rock

Test 10 change ADV position to ADV2 370.5
ADV1 197.4

@ 17 cm from toe

Test 11 @ 15 cm from toe

Test 12 @ 7 cm from toe

Test 13 @ 1 cm from toe

5cm from toe

Test 14 @ 1 cm from toe ADV2 368.5
ADV1 195.4

Test 15 @ 7 cm from toe

Test 16 @ 15 cm from toe

Dye test Done

---

Start experiment 2004. ADV2 372.5
ADV1 199.4

1 cm from toe

Test 1 @ 1cm from toe

Test 2 @ 3 cm from toe

Test 3 @ 5 cm from toe

Test 4 @ 7 cm from toe

Test 5 @ 9 cm from toe

Test 6 @ 11 cm from toe

Test 7 @ 13 cm from toe

Test 8 @ 15 cm from toe

Test 9 @ 17 cm from toe

3 cm from toe

Test 10 @ 17 cm from toe move ADV2 370.5
ADV1 197.4

Test 11 @ 15 cm from toe

Test 12 @ 7 cm from toe

Test 13 @ 1 cm from toe

5 cm from toe

Test 14 @ 1 cm from toe move ADV2 368.5
ADV1 195.4

Test 15 @ 7 cm from toe

Test 16 @ 15 cm from toe

Dye test

Run up = 12 cm
Run down = 8 cm

✓

Start experiment R005

ADV2 372.5
ADV1 199.4

mean WL = -0.0128

1cm from rock

Test 1 @ 1 cm from toe
Test 2 @ 3 cm from toe
Test 3 @ 5 cm from toe
Test 4 @ 7 cm from toe
Test 5 @ 9 cm from toe
Test 6 @ 11 cm from toe
Test 7 @ 13 cm from toe
Test 8 @ 15 cm from toe
Test 9 @ 17 cm from toe

3cm from toe

Test 10 @ 17 cm from toe move ADV2 = 370.5
ADV1 = 197.4
Test 11 @ 15 cm from toe
Test 12 @ 7 cm from toe
Test 13 @ 1 cm from toe

5cm from toe

Test 14 @ 1cm from toe move ADV2 = 368.5
ADV1 = 195.4
Test 15 @ 7cm from toe
Test 16 @ 15 cm from toe

Dye test. Done ; Run-up 11 cm
Run-down 6.5cm

Start experiment R006

ADV2 372.5
ADV1 199.4

mean WL @ -0.0071

1cm from rock

Test 1 @ 1cm from toe
Test 2 @ 3cm from toe
Test 3 @ 5cm from toe
Test 4 @ 7cm from toe
Test 5 @ 9 cm from toe
Test 6 @ 11 cm from toe
Test 7 @ 13 cm from toe
Test 8 @ 15 cm from toe
Test 9 @ 17 cm from toe

✓

3cm from toe

Test 10 @ 17cm ADV2 370.5
ADV1 197.4

Test 11 @ 15cm ; Start on 11th June 0

Wednesday

Test 12 @ 7cm from toe

Test 13 @ 1cm from toe

5cm from toe

Test 14 @ 1cm from toe ADV2 368.5
ADV1 195.4

Test 15 @ 7cm from toe

Test 16 @ 15cm from toe

Dye test Run up 19.5
Run down 8.5

Start Expriment R007

1cm from rock

Test 1 @ 1cm ADV2 372.5
ADV1 199.4

Test 2 @ 3cm

Test 3 @ 5cm

Test 4 @ 7cm

Test 5 @ 9cm

Test 6 @ 11cm

Test 7 @ 13cm

Test 8 @ 15cm

Test 9 @ 17cm

3cm from rock

Test 10 @ 17cm move ADV 2 370.5
ADV1 197.4

Test 11 @ 15cm

Test 12 @ 7cm

Test 13 @ 1cm

5cm from rock

Test 14 @ 1cm move ADV2 368.5
ADV1 195.4

Test 15 @ 7cm

Test 16 @ 15cm

Dye test Run up 17.5 cm
Run down 9.0 cm

Done

✓ Loess

~~88~~ Let out water of flume to 0.5

R008 = $h_m = 0.3$ ; $H = 0.1$ ; $T = 1.790_s$

1cm from toe

Test 1 @ 1cm from toe ADV2 372.5
ADV1 199.4

Test 2 @ 3 cm from toe

Test 3 @ 5cm from toe

Test 4 @ 7cm from toe

Test 5 @ 9cm from toe

Test 6 @ 11 cm from toe

Test 7 @ 13 cm from toe

Test 8 @ 15 cm from toe

Test 9 @ 17 cm from toe

3 cm from toe

Test 10 @ 17 cm from toe move ADV2 to 370.5
ADV1 to 197.4

Test 11 @ 15 cm from toe

Test 12 @ 7 cm from toe

Test 13 @ 1 cm from toe

5cm from toe

Test 14 @ 1cm from toe move ADV2 368.5
ADV1 195.4

Test 15 @ 7cm from toe

Test 16 @ 15 cm from toe

Dye test , Run up = 10.5cm
Run down = 5cm

R009 = $h_m = 0.3$ ; $H = 0.1$ ; $T = 1.265s$

1cm from rock

Test 1 @ 1cm from toe ADV2 372.5
ADV1 199.4

Test 2 @ 3cm from toe

Test 3 @ 5cm from toe

Test 4 @ 7cm from toe

Test 5 @ 9cm from toe

Test 6 @ 11 cm from toe

Test 7 @ 13 cm from toe

✓ 1cm from rock
Test 8 @ 15 cm from toe
Test 9 @ 17 cm from toe

Start Thursday 12/08

3 cm from rock
Test 10 @ 17 from toe move
Test 11 @ 15
Test 12 @ 7
Test 13 @ 1

ADV2 ~~19~~ 370.5
ADV1 197.4

5 cm from rock
Test 14 @ 1 cm from toe
Test 15 @ 7cm
Test 16 @ 15 cm

ADV2 368.5
ADV1 195.4

Dye test

Run up = 6.8 cm
Run down = 4.0 cm

R010 = Hm = 0.3 ; H = 0.15 ; T = 2.197

1 cm from rock
Test 1 @ 1 cm
Test 2 @ 3 cm
Test 3 @ 5 cm
Test 4 @ 7cm
Test 5 @ 9cm
Test 6 @ 11 cm
Test 7 @ 13 cm
Test 8 @ 15 cm
Test 9 @ 17cm

ADV2 372.5
ADV1 199.4

Run up = 14.3 cm
Run down = 5.5 cm

3 cm from rock
Test 10 @ 17 cm move
Test 11 @ 15 cm
Test 12 @ 7cm
Test 13 @ 1cm

ADV2 370.5
ADV1 197.4

5 cm from rock
Test 14 @ 1cm
Test 15 @ 7cm
Test 16 @ 15 cm

ADV2 368.5
ADV1 195.4

Dye test ✓

✓ RO11 ; $H_m = 0.3$; $H = 0.15$; $T = 1.898$

1cm from Rock

Test 1 @ 1cm from toe
Test 2 @ 3cm from toe
Test 3 @ 5cm from toe
Test 4 @ 7cm from toe
Test 5 @ 9cm from toe
Test 6 @ 10cm from toe
Test 7 @ 13 cm from toe
Test 8 @ 15 cm from toe
Test 9 @ 17cm from toe

3cm from Rock

Test 10 @ 17 from toe ADV2 370.5
ADV1 197.4
Test 11 @ 15 from toe
Test 12 @ 7 from toe
Test 13 @ 1 from toe

5cm from rock

Test 14 @ 1 from toe ADV2 368.5
ADV1 195.4
Test 15 @ 7
Test 16 @ 15

Run up = 17.5 cm
Run down = 5.5 cm

Dye test

RO12 ; $H_m = 0.3$; $H = 0.15$; $T = 1.550$

1cm from rock

Test 1 @ 1cm from toe ADV2 372.5
ADV1 199.4
Test 2 @ 3cm
Test 3 @ 5cm
Test 4 @ 7cm
Test 5 @ 9cm
Test 6 @ 11 cm
Test 7 @ 13 cm
Test 8 @ 15 cm
Test 9 @ 17cm

✓

R012 continued

3 cm from rock
Test 10 @ 17 cm move ADV2 370.5
ADV1 197.4
Test 11 @ 15 cm
Test 12 @ 7 cm
Test 13 @ 1 cm

5 cm from rock
Test 14 @ 1 cm ADV2 368.5
ADV1 195.4
Test 15 @ 7 cm
Test 16 @ 15 cm

Run-up = 13.8
Run-down = 6cm

Dye test

R0013 $h_m = 0.3$ $H = 0.2$ ; $T = 2.531$

⇒ Not possible wave generator trips !

Try R014 ; $h_m = 0.3$ ; $H = 0.2$ $T = 1.789$ → le

Test 1 @ 1 cm from toe → vectrino 1 doesn't read pr

Test 3 @ 5 cm from toe

→ Not possible wave gen. trips !
after short while
let out water

R015 $h_m = 0.2$ $H = 0.1$ $T = 1.790$ Start Fri 13

1cm from rock
Test 1 @ 1cm from toe ADV2 372.5
ADV1 199.4
Test 2 @ 3 cm from toe
Test 3 @ 5 cm from toe
Test 4 @ 7cm from toe
Test 5 @ 9 cm from toe
Test 6 @ 11 cm from toe
Test 7 @ 13 cm from toe
Test 8 @ 15 cm
Test 9 @ 17 cm

Test 10 @ 17 cm move ADV to 370.5
197.4

too high ; partially out of water

✓

use

2 cm from rock

- Test 11 @ 17 cm
- Test 12 @ 15 cm
- Test 13 @ 7 cm → partially out of water
- Test 14 @ 1 cm
- Test 15* @ 1 cm

Dye test

* 0.5 cm from rock
371.5
198.4

move to 372.0
Run up = 9 cm
Run down = 4 cm

**RO16** $h_m = 0.2$ $H = 0.1$ $T = 1.2650$

Test 1 @ 1 cm ADV2 372.5
199.4

Test 2 @ 3 cm

Test 3 @ 5 cm

Test 4 @ 7

Test 5 @ 9 Run up = 4 cm

Test 6 @ 11 Run down = 3.5 cm

Test 7 @ 13

Test 8 @ 15

Test 9 @ 17

Dye test

**RO17** $H_m = 0.2$ $H = 0.15$ $T = 2.197$

→ Test 1 → moved probe to face & lowered to ensure still within water.

At 17 cm from toe AD2 174.0
ADV1 200.9

probe check ok

Test 2 @ 15 cm

prox check ok & still water restart machine

→ Stopped test run after completion damage near toe @ slope/toe interface occurring repaired

no other test possible due to limited water depth

Cancel test 18 & 19 → Wave generator cannot cope

move wave gauges

✓

Recalibrate wave gauges
Run probe check at ADV 2 372.5
ADV 1 199.4

OK ; "mouse under carpet" still present
affects V1 less than V2

Start Irregular wave studies @ 3:40

Duration 1790 s

actual incident wave 7cm

IO20 ; $h_m = 0.4m$ ; $H_s = 0.1m$ ; $T_p = 1.790s$
Test 1 @ 1cm from toe ADV2 372
ADV1 199.

Test 2 @ 7 cm from toe
Test 3 @ 15 cm from toe
Test 4 @ 7 cm at ADV2 370.5
ADV1 197.4

Test IO21 ; $h_m = 0.4$ ; $H_s = 0.1$ $T_p = 1.265$
Test 1 @ 1cm from toe ADV2 372.
ADV1 199.4

Duration 1300s

Test 2 @ 7cm from toe
Test 3 @ 15 cm from toe
Test 4 @ 7cm from toe ADV2
370
197.4

finish

Tuesd 17th June'08 Test IO22 ; $h_m = 0.4$ ; $H_s = 0.15$ ; $T = 2.197$
Test 1 @ 1cm from toe ADV2 372.5
ADV1 199.4

Stopped due to wave maker breaking down

restart as 1a

Stopped due to wave maker breaking down

change input file so that it repeats every 10 min the wave climate

restart as 1b change to 10 min duration to steering size this reduces max. wave height

✓

Test 2 @ 7 cm from toe

Test 3 @ 15 cm from toe

Test 4 @ 7 cm from toe    ADV2 370.5
ADV1 197.4

<u>Wednesday</u> 18th June 08 → Sanders is measuring

I023 ; $h_m = 0.4$ ; $H = 0.15$ ; $T = 1.550$

Test 1 @ 1 cm from toe    signal quality ↓

Test 2 @ 7 cm from toe    signal qual. ↓ ; added powder in last min. signals improve

Test 3 @ 15 cm from toe

Test 4 @ 7 cm ; ADV2 370.5
ADV1 197.4

after ≈ 1200s powerfailure

Test 4 b    signal not good → stopped

Test 4 c    rerun after adding powder

<u>Thursday</u> 19th June 08 → Sanders / JK

I024    steerfiles result in too high Voltage
× cancelled    ($H = 0.2$ ; $T = 2.531$)

I025    generator stopped after 2 min
changed pcf-file from $H = 0.2 \rightarrow H = 0.18$
$T = 1.789s$
lower Voltage of ± 6.3 V as this should work in generator
Normally waves higher in Jonswap than put in height

Test 1 @ position 7 cm ; ADV2 370.5
rename 4    ADV1 197.4

↳ Rename afterwards to Test 4

Test ~~1~~ 1 @ position 1 cm ; ADV2 372.5
ADV1 199.4

Test 2 ✓
3 ✓

✓ Test I 022 6

I024B → changed pcf file H=0.2

with no reflect. comp.

no second order

200 - 580 sec

I 025 → $H_m = 0.4$ ; $H = 0.2$ ; $T = 1.789s$ → not possible

I 026 $H_m = 0.3$ ; $H = 0.1$ ; $T = 1.790s$

pos 1 → @ 1cm
pos 2 @ 7cm
pos 3 @ 15 cm
pos 4 @ 7cm

ADV2 370.5
ADV1 197.4

Dye test Done

$h_m = 0.3m$ ; $H = 0.1$ ; $T = 1.265s$

I 027. pos 1 @ 1cm done JK left

Sanders does tests

pos 2 @ 7cm

pos 3 @ 15cm

pos 4 a @ 1cm
pos 4 b @ 7cm
} 2 cm higher 370.5 197.4

Dye test Done

I 028 $h_m = 0.3$ ; $H = 0.15$ $T = 2.197s$

pos 1 @ 1 cm → $H_{mo} = 0.108$ m

pos 2 @ 7 cm

pos 3 @ 15cm $H_{mo} = 0.108m$

pos4 @ 7cm ; 2 cm higher

Dye test done but forgot to change no of frames pr

Slope damaged ; Sanders repaired slope

✓

I029 $h_m$ = 0.3 ; H = 0.15 ; T = 1.550 s

pos 1. @ 1cm done → $H_{m0}$ = 0.104

pos 2 @ 7cm done $H_{m0}$ = 0.105

pos 3 @ 15cm

pos 4 @ 7cm but 2cm higher ADV2 370.5 cm
197.4 cm

Dye test done

Let out water,

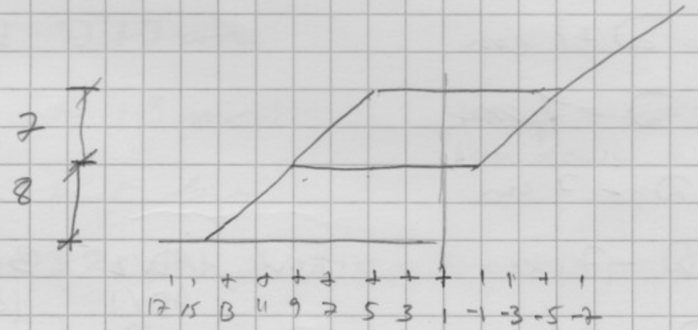
Tuesday →JK: Rebuild slope with rock & increase toe length

Wednesday 25th June '08

→ Let in water, JK restarts with measurements

R030 ; $h_t$ = 0.15 ; $h_m$ = 0.4; H = 0.1; T = 1.790

positions



Start at

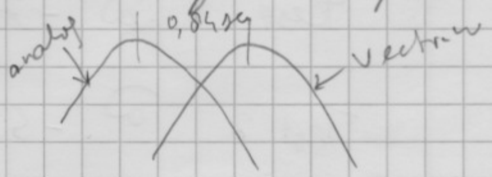
pos. 1 @ -7 cm, height at ADV2: 365.5 ; ADV1: 192.4

check probe, OK; approx. 1.5 cm from bed

check calibration

→ Sanders checked delay in analogue output

→ 0.84 s before Vectrino



Set between analog/analogue no delay

$\Delta t$ = 0,04 sec

✓

After lunch start tests

Test 1 @ -7cm — ADV2 365.5 ⇒ / ADV1 192.4

$H_{mo}$ = 0.099 m

Test 2 @ -5cm

Test 3 @ -3cm

Test 4 @ -1cm

Test 5 @ +1cm

Test 6 @ +3cm

Test 7 @ +5cm

Test 8 @ +7cm

Test 9 @ +9cm

Test 10 @ +9cm — move ADV 2 363.5 / ADV 1 190.4

Test 11 @ +7cm

Test 12 @ +1 cm

Test 13 @ -7 cm

Test 14 @ -7cm

Test 15 @ -7cm — move ADV2 361.5 / ADV1 188.4

Test 16 @ -1 cm

Test 17 @ +1cm

Test 18 @ +7cm

Test 19 @ +9cm

Run up - 6.5 cm
Run down - 5.5cm

Dye test Done ✓

**RO31** $H_t$ = 0.15 ; Hm = 0.4 ; H = 0.1 ; T = 1.26

Test 1 @ -7cm — ADV2 365.5 / ADV1 192.4

Test 2 @ -5cm

Test 3 @ -3cm

Test 4 @ -1cm

Test 5 @ +1cm

Test 6 @ +3cm

✓ Test 7 @ + 5cm

Test 8 @ + 7cm

Test 9 @ + 9cm

Test 10 @ + 9 cm move ADV2 to 363.5
ADV 1 to 190.4

Stop at 6.15 pm

Test 11 @ + 7cm Restart Thursday 26th Jun '08

Test 12 @ + 1cm

Test 13 @ - 1cm

Test 14 @ - 7 cm

Test 15 @ - 7 cm move ADV2 361.5
ADV 1 188.4

Test 16 @ - 1cm

Test 17 @ + 1cm

Test 18 @ + 7 cm

Test 19 @ + 9 cm run up - 5.5 cm
run down - 4.5 cm

Dye - test done

Test R032 ; $h_t = 0.15$; $H = 0.15$; $T = 2.197$ s

Test 1 @ -7cm ADV2 365.5
ADV 1 192.4

Test 2 @ - 5cm

Test 3 @ - 3 cm

Test 4 @ - 1 cm

Test 5 @ +1 cm

Test 6 @ +3

Test 7 @ +5

Test 8 @ +7

Test 9 @ +9

Test 10 @ 15 cm

Test 11 @ 15 cm move ADV 2 363.5
ADV 1 190.4

✓

Test 12 @ +9 cm
Test 13 @ +7 cm
Test 14 @ +1 cm
Test 15 @ -1 cm
Test 16 @ -3 cm
Test 17 @ -5 cm
Test 18 @ -7 cm
Test 19 @ -9 cm
Test 20 @ -11
Test 21 @ -11 , ADV lowered again 365.5;
→ Test 22 @ -11 ADV raised to 361.5 ; 188.4
Test 23 @ - 9
Test 24 @ - 7
Test 25 @ -5
Test 26 @ -3
Test 27 @ -1
Test 28 @ +1
Test 29 @ +7
Test 30 @ +9
Test 31 @ +15
Test 32 @ +15 ADV raise to 359.5 ; 186.4
Test 33 @ +7
Test 34 @ +1
Test 35 @ -1
Test 36 @ - 5 → "dirty signal"

✓ Start Friday

Redo Test 36 as 36a @ -5

Test 37 @ -7

Test 38 @ -9

Test 39 @ -11

Test 40 @ -11 ADV2 357.5 ; ADV1 184.4

Test 41 @ -5

Test 42 @ -1

( Test 43 @ +1 )

Test 43 @ +7

Run up 14.6 cm
Run down 8.0 cm

Test 45 @ +15 Done

Redo R031 for pos -11, -5

Test 20 @ -11 , ADV2 @ 365.5 , ADV1 192.4

Test 21 @ -11 ADV2 @ 363.5 , ADV1 190.4

Test 22 @ - 5

Test 23 @ - 5 ADV2 @ 361.5 ; ADV1 188.4

Test 24 @ -11

Redo R030 for pos -11, -5

Test 20 @ -11 ADV2 @ 365.5 ; ADV1 192.4

Test 21 @ -11 ADV2 @ 363.5 ; ADV1 190.4

Test 22 @ -5

Test 23 @ -5 ADV2 @ 361.5 ; ADV1 188.4

Test 24 @ -11

✓ Test R033 $h_t = 0.15$ ; $h_m = 0.4$ ; $H = 0.15$ ; $T = 1.898$ s

Test 1 @ -11 ; ADV2 365.5 ; ADV1 192.4

Test 2 @ -9

Run up = 11.8 cm
Run down = 8 cm

Test 3 @ -7

Test 4 @ -5

Test 5 @ -3

Test 6 @ -1

Test 7 @ +1

Test 8 @ +3

Test 9 @ +7

Test 10 @ +15

Test 11 @ +15 ; ADV2 363.5 ; ADV1 ; 190.4

Test 12 @ +7 ;

Test 13 @ +3

Test 14 @ +1

Test 15 @ -1

Test 16 @ -5

Test 17 @ -7

Test 18 @ -11

Test 19 @ -11 ADV2 361.5 ; 180.4

Test 20 @ -5

Test 21 @ ~~+~~-1

Test 22 @ +1

Run up ; Run down

Test R034 ; $h_t = 0.15$ ; $h_m = 0.4$ ; $H = 0.15$ ; $T = 1.550$ s

Test 1 @ -11 ; ADV2 365.5 ; ADV1 192.4

Test 2 @ - 9

Run up 11.5 cm
Run down 7 cm

Test 3 @ - 7

Test 4 @ -5

✓ Test 5 @ -3

Test 6 @ -1

Test 7 @ +1

Test 8 @ +3

Test 9 @ +7

Test 10 @ +15

Test 11 @ +15 ; ADU2 363.5; ADU1 190.4

Test 12 @ +7

Test 13 @ +3

Test 14 @ +1

Test 15 @ -1

Test 16 @ -5

Test 17 @ -7

Test 18 @ -11

Test 19 @ -11 ADU2 361.5 ; 188.4

Test 20 @ -5

Test 21 @ -1

Test 22 @ +1 Dye test done on monday morning

Test R035 ; $h_t = 0.15$; $h_m = 0.4$; $H = 0.2$; $T = 2.531s$

Test 1 @ -11 ADU2 365.5 ADU1 192.4

Test $\overset{1a}{2}$ @ - 9

Test 3 @ - 7

Test $\overset{3a}{4}$ @ - 5

test 4a @ -5 with different range ± $1ms^{-1}$

Test 5 @ -3 with range ± $1ms^{-1}$

Test 5a @ -3 with range ± $0.3ms^{-1}$

Test 6 @ -1

Test 7 @ +1

✓ Test 8 @ +3

Test 9 @ +5

Test 10 @ +7

Test 11 @ +15

Test 12 @ +15 move ADV2 363.5 ; 190.4

Test 12a @ +15 , change to ± 1m/s

Test 13a @ +7 at ± 1m/s

Test 13 @ +7 a ± 0.3 cm

Test 14 @ +3 ± 0.3cm

Test 14a @ +3 at ± 1m/s

Test 15a @ +1 at ± 1m/s

Test 16a @ -1

Test 17a @ -5 } ± 1ms

Test 18a @ -7

Test 19a @ -11

Test 20a @ -11 , move ADV2 361.5 ; 188.4

Test 21a @ -5 } +1ms$^{-1}$

Test 22a @ -1

Test 23a @ +1 Dye test Done

<u>Test Q036</u> $h_t = 0.15$ ; $h_m = 0.4$ ; $H = 0.2$ ; $T = 1.78$

Test 1 @ -11 → Abort stones moved i.e. redo as

1a @ -11 all outputs to ± 1ms

Test 2 @ -9

Test 3 @ -7

Test 4 @ - 5

Test 5 @ -3

Test 6 @ -1

Test 7 @ +1

✓ Test 8 @ +3

Test 9 @ +5

Test 10 @ +7

Test 11 @ +15

Test 12 @ +15 ADV2 363.5 ; 190.4

Test 13 @ +7

Test 14 @ +3

Test 15 @ +1

Test 16 @ -1 Stones moved → placed back

Test 17 @ -5

Test 18 @ -7

Test 19 @ -11

Test 20 @ -11 move 361.5 ; 188.4

Test 21 @ -5

Test 22 @ -1

Test 23 @ +1 Run-up 16cm

Run-down 11.5cm

Dye test done

Do irregular tests at same water level

J049 ; $h_t$=0.15 ; $h_m$=0.4 ; $H_s$=0.1 ; $T_p$ = 1.790

Test 1 @ -11 ; } ADV2 @ 365.5 ; ADV1 @ 192.4

Test 2 @ -5 ; ± 0.3 output

Test 3 @ -1 ;

Test 4 @ +1 ;

Test 5 @ +1 move ADV2 @ 363.5 ; 190.4

Test 6 @ -1

Test 7 @ -5 Restart Wednesday

Dye test

✓

I050 ; $h_t = 0.15$ ; $h_m = 0.4$ ; $H_s = 0.1$ ; $T_p = 1.265$

Test 1 @ -11 ; ADV2 365.5 ; ADV1 192.4

Test 2 @ -5

Test 3 @ -1

Test 4 @ +1

Test 5 @ +1 move ADV2 363.5 ; ADV1 190.4

Test 6 @ -1

Test 7 @ -5 Dye test ✓

I051 ; $h_t = 0.15$ ; $h_m = 0.4$ ; $H_s = 0.15$ ; $T_p = 2.197$

Test 1 @ -11

Test 2 @ -5 Dye test done ✓

Test 3 @ -1

Test 4 @ +1

Test 5 @ +1 move ADV2 363.5 ; ADV1 190.4

Test 6 @ +1 Restart on friday at 2.30 pm

Test 7 @ -1

Test 8 @ -5

Test I052 , $h_t = 0.15$ , $h_m = 0.4$ ; $H_s = 0.15$ ; $T_p = 1.550s$

Test 1 @ -11

Test 2 @ -5

Test 3 @ -1 Dye test done

Test 4 @ +1

Test 5 @ +1 move ADV2 363.5 ADV1 190.4

Test 6 @ -1

Start Monday 7am

Test 7 @ -5

✓

Test I053 — Wavemaker not working => machine cannot generate !

I054 first ; $H_t = 0.15$; $H = 0.2$; $T = 1.789$ ; $h_m = 0.4$

Test 1 @ -11 somewhat spikey signal
rock moved under [illegible]
redo experiment & change velocity output

Test 1a @ -11 ; output at ± $1 ms^{-1}$

Test 2 @ -5

Test 3 @ -1

Test 4 @ +1

Test 5 @ +1 ADV2 363.5 ; ADV1 190.4

Test 6 @ -1

Test 7 @ -5

R 038 $h_m = 0.3$ ; $h_t = 0.15$ ; $H = 0.1$ ; $T = 1.790$

Test 1 @ -11 ; ADV2 365.5 ADV1 192.4
1a use ± $1 ms^{-1}$

Test 2 @ -9

Test 3 @ -7

Test 4 @ -5
4a -5 with more particles but 7mm, 48 more particle 2.5mm
Test 5 @ -3

Test 6 @ -1

Test 7 @ +1

Test 8 @ +3

Test 9 @ +5

Test 10 @ +7
10a +7 change volume of measure to 7mm from 25
Test 11 @ +15

Test 12 @ 15 move ADV2 to 363.5 ; 190.4

Test 13 @ +7

Test 14 @ +1
Test 15 @ -1

✓

Test 16 @ -5

Test 17 @ -11 Run up 7.8 cm Dyetest
Run down 5.5 cm

R038 $h_t=0.15$ ; $hm=0.3$ ; $H=0.1$ ; $T=1.265$

Test 1 @ -11 ADV2 365.5 ; ADV1 192.4

Test 2 @ -9

Test 3 @ -7

Test 4 @ -5

Test 5 @ -3

Test 6 @ -1 Restart on Wed. 9th July

Test 7 @ +1

Test 8 @ +3

Test 9 @ +5

Test 10 @ +7

Test 11 @ +15

Test 12 @ +18 move ADV2 363.5 ADV1 190.4

Test 13 @ +7

Test 14 @ +1

Test 15 @ -1

Test 16 @ -5

Test 17 @ -11

Run up : 7.3 cm
Run down : 4.5 cm

Dye test ✓

R039

Test 1 @ -11 ADV2 365.5 ADV1 192.4
at limit → almost out of water at

Test 2 @ -9

Test 3 @ -7

Test 4 @ -5

✓ Test 5 @ -3

Test 6 @ -1

Test 7 @ +1

Test 8 @ +3 Run-up 21 cm

Test 9 @ +5 Run down 7.2 cm

Test 10 @ +7

Test 11 @ +15

Cannot move higher as at limit due to wave draw down

Dye test ✓

R040 ; $h_m = 0.3$ ; $H = 0.15$ ; $T = 1.898$ ; $h_t = 0.15$

Test 1 @ -11

Test 2 @ -9

Test 3 @ -7

Test 4 @ -5

Test 5 @ -3

Test 6 @ -1 Run up 15 cm

Test 7 @ +1 Run down 7 cm

Test 8 @ +3

Test 9 @ +5

Test 10 @ +7

Test 11 @ +15 Dye test ✓

R041 ;

Test 1 @ -11

Test 2 @ -9

Test 3 @ -7

Test 4 @ -5

Test ~~6~~ 5 @ -3

Test ~~7~~ 6 @ -1

Test ~~8~~ 7 @ +1

✓ Test 8 @ +3

Test 9 @ +5

Test 10 @ +7

Test 11 @ +15

Run up 13.5 cm

Run down 7cm

Dye test done ✓

Extra test

I055 ; $h_m = 0.3$ ; $H = 0.1$ ; $T_p = 1.790$ s

Test 2 @ -11

Test 2 @ -5

Measurement PC No : Meetpc 08

Analys. PC NO : Meetpc 11

→ CD/DVD backup done

→ one copy with Sanders

photo's still camera
2 tapes for video } still to be backed up

✓ ①

Sanders,

I haven't done IO23 yet, run out of time

$h_m = 0.4$   $H = 0.15$ ; $T = 1.550s$

28 min

4 × 1700 secs

If you could run that one first that would be great.

Thank you for all your help,

Julian

P.S Camera is in lockable cupboard with green key – I left it in the safe near loo

test 1   the signals from the ADV's are not nice.

test 2   last minute some curling of the water
after ~~curling~~, the signal is better.

test 3 (146+1700 = 1850) to stir something

test 4 (40+1700 = 1740) nice signal from the ADV
∟ after 1200 secs power fail

test 4b (78 + 1700 = 1780) signal is not nice
stopped!

show ch 4, 6, 11, 13   after ~~curling~~ it's better

test 4c (1750) ?

I 024 not possible to make the steerfile

I 025 the generator stopped after 2 minutes.
(± 6,3V) changed the .pcf-file $H = 0.2 \rightarrow H = 0.18$
(1900 secs) → pos. 4. done $\rightarrow H_r = 0.13$ m
pos 1 done
pos 2 done
pos 3 done

I 024b changed the .pcf file $H = 0.2$
<u>no</u> refection compensation
<u>no</u> second-order
200 - 580 sec
5000 - 14500 samples

I 026 pos 1 ✓
pos 2 ✓
pos 3 ✓
pos 4 ✓
Dye test Done

I 027 pos 1 Done ⇒
pos 2 done $\rightarrow H_R = 0.07$
pos 3 done $\rightarrow H_{m_0} = 0.07$
not on 7 cm but on 1 cm ← pos 4 done
redone on position 7 cm as test 24b → signal not nice
Dye test done

Sanders I won't be in till monday eve about 5.15 pm as my exam finishes 5 pm.
if you have time then continue otherwise do not worry. Julia ☺

I 028
pos 1 done $\rightarrow H_{m_0} = 0.108$ m
pos 2 done
pos 3 done $\rightarrow H_{m_0} = 0.108$ m
pos 4 done

Dye test done ( numbers not correct! )

## Testing

Locations

Position ① is at 1cm from toe

ADV2 @ 372.5
ADV1 @ 199.4

Position ② is at 7cm from toe

ADV2 @ 372.5
ADV1 @ 199.4

Position ③ is at 15cm from toe

ADV2 @ 372.5
ADV1 @ 199.4

Position ④ is at 7cm from toe

move 2cm! * { → ADV2 @ 370.5
→ ADV1 @ 197.4

Always test for 1000 waves + allow some 100s slack ~~etc~~

∴ Test no

I024 is at $h_m = 0.4$ water level (ie. 0.6 near wave generator)

$H_s = 0.2m$ ; $T_p = 2.531s$

test 1 ⇒ Position 1
test 2 ⇒ Position 2
test 3 ⇒ Position 3
test 4 ⇒ Position 4

Do a quick short Dye test with video cam to help visualise motion say 3 min long or so;

label note on glass panel accordingly to ensure later can be identified

✓ notation / folder org in computer

all data goes into

D:\Julia\Measurements \ $h_m = 0.4$ \ $H = 0.152$\ Jonswap\
$T = 2.197$\ ...

Test 1
Test 2
Test 3
Test 4

Vect_1_Test 1
Vect-2_Test 1

Vect_1_Test 2
Vect_2_Test 2

⋮

Tests to be done:

* I024 → ~~$h_m = 0.4$ ; $H = 0.2$ ; $T = 2.531$ s~~ ← not possible
~~Positions 1→4 + Dye test~~ 45 min

?, is possible?,

I025 → ~~$h_m = 0.4$ ; $H = 0.2$ ; $T = 1.789$ s~~
±7.2V
~~Positions 1→4 + Dye test~~ 31 min

I026 → $h_m = 0.3$ ; $H = 0.1$ ; $T = 1.790$ s
Positions 1→4 + Dye test 32 min

I027 → $h_m = 0.3$ ; $H = 0.1$ ; $T = 1.265$ s
Positions 1→4 + Dye test 23 min

→ I028 → $h_m = 0.3$ ; $H = 0.15$ ; $T = 2.197$ s
Positions 1→4 + Dye test 38 min

I029 → $h_m = 0.3$ ; $H = 0.15$ ; $T = 1.550$ s
Positions 1→4 + Dye test 28 min

Completed this series → thereafter need to change toe structure !

Let water out?

## Explanation of notation in tables

### Location

| X | Y |
|---|---|

Refers to the X and Y location of the measurement probe

### Loading Parameters

| Hm0 | Tp |
|---|---|

Refers to the generated offshore wave height and period, based on results from spectral analysis using Decomp or from expected result if Decomp did not work

### U0

Expected theoretical shallow water wave velocity based on U0= pi H/T * {1/sinh (kh), where h=hm-ht and k is determined using Eckarts approximation formulation k ~alpha(tanh(alpha)^(-0.5))/h and alpha = k0 *d

### Resultant Max.

| R - Vx1 | R - Vx2 | R - WL |
|---|---|---|

R-Vx1 is the resultant maximum value of the horizontal velocity vector of the ADV1

R-Vx2 is the resultant maximum value of the horizontal velocity vector of the ADV2

R-WL is the resultant maximum value of the waterlevel

### Test

| R001 |
|---|

R001 is the overall test series name i.e. R001 to R041 relating to the input parameters

Test1 is the sub test name i.e. relating to each position in X and Y

### Coefficient for Vx1

| a0 | a1 | b1 | w |
|---|---|---|---|

a0 refers to the a0 constant of the Fourier fit

a1 refers to the a1 coefficient of the Fourier fit (cos)

b1 refers to the b1 coefficient of the Fourier fit (sin)

w refers to the angular phase velocity of the Fourier fit

## Goodness of fit parameters

| sse | rsq | dfe | adj | rmse |
|---|---|---|---|---|

For each Fourier fit, the goodness of fit parameters are provided,

sse is the  sum of squares due to error

rsq is the Coefficient of determination

dfe is Degrees of freedom

adj Degree-of-freedom adjusted coefficient of determination

rmse Root mean squared error (standard error)

| Location | | Loading Parameters | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R001 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse |
| 1 | 1 | 0.09533 | 1.796 | 0.2401 | 0.250 | 0.254 | 0.029 | Test 1 | 0.0339 | -0.2055 | 0.0665 | 3.51 | 36.1681 | 0.8287 | 7489 | 0.829 | 0.0695 | 0.0333 | -0.2013 | 0.09044 | 21.442 | 0.895 | 7489 | 0.895 | 0.0535 | 5.30E-05 | -0.028 | 0.009 | 0.18 | 0.9473 | 7489 | 0.947 | 0.0049 |
| 3 | 1 | 0.09533 | 1.796 | 0.2401 | 0.262 | 0.273 | 0.036 | Test 2 | 0.0275 | 0.2279 | 0.0556 | 3.51 | 22.3385 | 0.9022 | 7489 | 0.902 | 0.0546 | 0.0376 | 0.2349 | 0.01851 | 16.799 | 0.925 | 7489 | 0.925 | 0.0474 | 7.94E-03 | 0.02054 | 0.019 | 0.173 | 0.9442 | 7489 | 0.944 | 0.0048 |
| 5 | 1 | 0.09533 | 1.796 | 0.2401 | 0.267 | 0.278 | 0.035 | Test 3 | 0.0196 | -0.0772 | -0.2355 | 3.51 | 80.6156 | 0.7406 | 7489 | 0.741 | 0.1038 | 0.0301 | -0.09198 | -0.2301 | 15.37 | 0.937 | 7489 | 0.937 | 0.0453 | 8.77E-03 | 0.0056 | -0.026 | 0.156 | 0.9439 | 7489 | 0.944 | 0.0046 |
| 7 | 1 | 0.09533 | 1.796 | 0.2401 | 0.265 | 0.274 | 0.025 | Test 4 | 0.0292 | -0.0847 | 0.2199 | 3.51 | 165.096 | 0.5575 | 7489 | 0.557 | 0.1485 | 0.0206 | -0.1001 | 0.2324 | 23.76 | 0.91 | 7489 | 0.91 | 0.0563 | 5.00E-07 | -0.0201 | 0.015 | 0.13 | 0.9472 | 7489 | 0.947 | 0.0042 |
| 9 | 1 | 0.09533 | 1.796 | 0.2401 | 0.287 | 0.271 | 0.024 | Test 5 | 0.0291 | -0.1439 | 0.2135 | 3.51 | 12.9472 | 0.9508 | 7537 | 0.951 | 0.0414 | 0.0171 | -0.1413 | 0.2107 | 11.09 | 0.956 | 7537 | 0.956 | 0.0384 | 4.40E-04 | -0.0212 | 0.011 | 0.113 | 0.9504 | 7537 | 0.95 | 0.0039 |
| 11 | 1 | 0.09533 | 1.796 | 0.2401 | 0.287 | 0.268 | 0.023 | Test 6 | 0.0285 | -0.2498 | 0.0664 | 3.51 | 11.5007 | 0.9561 | 7489 | 0.956 | 0.0392 | 0.0139 | -0.2472 | 0.05766 | 17.797 | 0.931 | 7489 | 0.931 | 0.0487 | 7.66E-04 | -0.0221 | 0.005 | 0.087 | 0.9565 | 7489 | 0.957 | 0.0034 |
| 13 | 1 | 0.09533 | 1.796 | 0.2401 | 0.285 | 0.262 | 0.031 | Test 7 | 0.0271 | 0.0355 | 0.2555 | 3.51 | 9.8966 | 0.9618 | 7489 | 0.962 | 0.0364 | 0.0133 | 0.03235 | 0.2465 | 17.254 | 0.931 | 7489 | 0.931 | 0.048 | 9.42E-03 | 0.00334 | 0.021 | 0.071 | 0.9609 | 7489 | 0.961 | 0.0031 |
| 15 | 1 | 0.09533 | 1.796 | 0.2401 | 0.275 | 0.256 | 0.030 | Test 8 | 0.0222 | -0.1633 | 0.1925 | 3.51 | 12.1677 | 0.9515 | 7489 | 0.952 | 0.0403 | 0.0108 | -0.1694 | 0.1769 | 18.28 | 0.925 | 7489 | 0.925 | 0.0494 | 9.16E-03 | -0.0162 | 0.013 | 0.061 | 0.9634 | 7489 | 0.963 | 0.0029 |
| 17 | 1 | 0.09533 | 1.796 | 0.2401 | 0.264 | 0.249 | 0.020 | Test 9 | 0.0172 | 0.2449 | 0.0286 | 3.51 | 15.8218 | 0.935 | 7489 | 0.935 | 0.046 | 0.0125 | 0.2325 | 0.04295 | 35.511 | 0.855 | 7489 | 0.855 | 0.0689 | 0.000121 | 0.0192 | 0.006 | 0.053 | 0.9664 | 7489 | 0.966 | 0.0027 |
| 17 | 3 | 0.09533 | 1.796 | 0.2401 | 0.304 | 0.256 | 0.020 | Test 10 | -0.0551 | -0.0153 | 0.2488 | 3.51 | 434.351 | 0.349 | 7489 | 0.349 | 0.2408 | 0.0178 | -0.02499 | 0.2373 | 33.099 | 0.866 | 7489 | 0.866 | 0.0665 | 0.000154 | 0.00425 | 0.02 | 0.054 | 0.9654 | 7489 | 0.965 | 0.0027 |
| 15 | 3 | 0.09533 | 1.796 | 0.2401 | 0.239 | 0.260 | 0.024 | Test 11 | 0.0364 | -0.1432 | -0.1427 | 3.51 | 220.959 | 0.4095 | 7489 | 0.409 | 0.1718 | 0.0177 | -0.1843 | -0.1575 | 37.385 | 0.855 | 7489 | 0.855 | 0.0707 | 3.45E-03 | -0.0128 | -0.016 | 0.062 | 0.9628 | 7489 | 0.963 | 0.0029 |
| 7 | 3 | 0.09533 | 1.796 | 0.2401 | 0.265 | 0.257 | 0.035 | Test 12 | 0.0177 | 0.2458 | -0.0288 | 3.51 | 37.1135 | 0.8607 | 7489 | 0.861 | 0.0704 | 0.0142 | 0.2387 | -0.0465 | 9.8521 | 0.957 | 7489 | 0.957 | 0.0363 | 9.97E-03 | 0.02301 | 0.01 | 0.13 | 0.9474 | 7489 | 0.947 | 0.0042 |
| 1 | 3 | 0.09533 | 1.796 | 0.2401 | 0.217 | 0.236 | 0.030 | Test 13 | 0.0068 | -0.1773 | -0.1137 | 3.51 | 14.6983 | 0.9188 | 7489 | 0.919 | 0.0443 | 0.0148 | -0.1933 | -0.1076 | 13.098 | 0.933 | 7489 | 0.933 | 0.0418 | 0.000145 | -0.0123 | -0.027 | 0.176 | 0.9483 | 7489 | 0.948 | 0.0049 |
| 1 | 5 | 0.09533 | 1.796 | 0.2401 | 0.446 | 0.266 | 0.030 | Test 14 | 0.3252 | -0.1192 | 0.0223 | 3.51 | 662.861 | 0.0768 | 7496 | 0.077 | 0.2974 | 0.0485 | -0.184 | 0.1169 | 599.73 | 0.229 | 7496 | 0.229 | 0.2829 | 0.000131 | -0.029 | 0.005 | 0.18 | 0.9475 | 7496 | 0.948 | 0.0049 |
| 7 | 5 | 0.09533 | 1.796 | 0.2401 | 0.269 | 0.262 | 0.025 | Test 15 | 0.0238 | 0.0783 | -0.2319 | 3.51 | 178.548 | 0.5571 | 7496 | 0.557 | 0.1543 | 0.0197 | 0.08818 | -0.2255 | 28.182 | 0.886 | 7496 | 0.886 | 0.0613 | 0.000119 | 0.01963 | -0.015 | 0.13 | 0.9475 | 7496 | 0.948 | 0.0042 |
| 15 | 5 | 0.09533 | 1.796 | 0.2401 | 0.312 | 0.263 | 0.027 | Test 16 | 0.0370 | 0.2724 | 0.0376 | 3.51 | 358.485 | 0.4415 | 7496 | 0.441 | 0.2187 | 0.021 | 0.2333 | 0.06582 | 31.338 | 0.876 | 7496 | 0.875 | 0.0647 | 6.31E-03 | 0.01842 | 0.009 | 0.063 | 0.9621 | 7496 | 0.962 | 0.0029 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R002 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.10250 | 1.244 | 0.218 | 0.139 | 0.149 | 0.026 | Test 1 | -0.0060 | 0.1194 | -0.0594 | 4.96 | 33.190 | 0.668 | 7496 | 0.668 | 0.067 | 0.0068 | 0.1377 | -0.0359 | 19.435 | 0.796 | 7496 | 0.796 | 0.0509 | 0.000606 | 0.02091 | -0.015 | 0.076 | 0.9702 | 7496 | 0.97 | 0.0032 |
| 3 | 1 | 0.10250 | 1.244 | 0.218 | 0.144 | 0.165 | 0.028 | Test 2 | 0.0030 | 0.0283 | 0.1379 | 4.97 | 16.142 | 0.822 | 7496 | 0.821 | 0.046 | 0.0077 | 0.04814 | 0.1496 | 12.389 | 0.882 | 7496 | 0.882 | 0.0407 | 0.000254 | 0.01535 | 0.023 | 0.088 | 0.9701 | 7496 | 0.97 | 0.0034 |
| 5 | 1 | 0.10250 | 1.244 | 0.218 | 0.147 | 0.180 | 0.029 | Test 3 | 0.0015 | 0.1330 | -0.0590 | 4.97 | 9.061 | 0.898 | 7496 | 0.898 | 0.035 | 0.0098 | 0.1441 | -0.0899 | 37.807 | 0.741 | 7496 | 0.741 | 0.071 | 5.11E-05 | 0.01796 | -0.023 | 0.112 | 0.9662 | 7496 | 0.966 | 0.0039 |
| 7 | 1 | 0.10250 | 1.244 | 0.218 | 0.150 | 0.171 | 0.031 | Test 4 | 0.0131 | 0.0635 | 0.1215 | 4.97 | 148.826 | 0.321 | 7496 | 0.321 | 0.141 | -0.011 | 0.06605 | 0.1453 | 21.448 | 0.817 | 7496 | 0.817 | 0.0535 | 0.000315 | 0.0261 | 0.016 | 0.133 | 0.9637 | 7496 | 0.964 | 0.0042 |
| 9 | 1 | 0.10250 | 1.244 | 0.218 | 0.158 | 0.166 | 0.033 | Test 5 | 0.0092 | 0.1179 | 0.0917 | 4.97 | 276.357 | 0.232 | 7496 | 0.232 | 0.192 | 0.0092 | 0.1294 | 0.08866 | 31.467 | 0.746 | 7496 | 0.746 | 0.0648 | 0.000529 | 0.03198 | 0.003 | 0.139 | 0.9651 | 7496 | 0.965 | 0.0043 |
| 11 | 1 | 0.10250 | 1.244 | 0.218 | 0.187 | 0.160 | 0.034 | Test 6 | 0.0268 | -0.0726 | -0.1426 | 4.97 | 149.029 | 0.392 | 7496 | 0.392 | 0.141 | 0.0052 | -0.07258 | -0.1366 | 10.835 | 0.892 | 7496 | 0.892 | 0.038 | 0.000747 | -0.0282 | -0.018 | 0.146 | 0.9663 | 7496 | 0.966 | 0.0044 |
| 13 | 1 | 0.10250 | 1.244 | 0.218 | 0.151 | 0.150 | 0.036 | Test 7 | 0.0032 | 0.0417 | 0.1413 | 4.97 | 4.796 | 0.944 | 7496 | 0.944 | 0.025 | 0.0016 | 0.03398 | 0.1447 | 18.546 | 0.817 | 7496 | 0.817 | 0.0497 | 0.000943 | 0.02438 | 0.025 | 0.144 | 0.9693 | 7496 | 0.969 | 0.0044 |
| 15 | 1 | 0.10250 | 1.244 | 0.218 | 0.148 | 0.148 | 0.037 | Test 8 | 0.0047 | 0.1401 | 0.0288 | 4.97 | 6.341 | 0.924 | 7496 | 0.924 | 0.029 | 0.0052 | 0.1384 | 0.03653 | 16.519 | 0.823 | 7496 | 0.823 | 0.0469 | 0.001172 | 0.03267 | -0.016 | 0.138 | 0.9727 | 7496 | 0.973 | 0.0043 |
| 17 | 1 | 0.10250 | 1.244 | 0.218 | 0.140 | 0.145 | 0.039 | Test 9 | 0.0035 | -0.0317 | -0.1324 | 4.97 | 3.088 | 0.958 | 7496 | 0.957 | 0.020 | 0.0084 | -0.02359 | -0.1346 | 19.904 | 0.779 | 7496 | 0.779 | 0.0515 | 0.001352 | -0.0291 | -0.024 | 0.126 | 0.9766 | 7496 | 0.977 | 0.0041 |
| 17 | 3 | 0.10250 | 1.244 | 0.218 | 0.139 | 0.144 | 0.039 | Test 10 | 0.0035 | 0.0428 | -0.1291 | 4.97 | 3.720 | 0.949 | 7496 | 0.949 | 0.022 | 0.0072 | 0.04157 | -0.1306 | 25.346 | 0.736 | 7496 | 0.736 | 0.0581 | 0.001379 | 0.00908 | -0.036 | 0.126 | 0.9765 | 7496 | 0.977 | 0.0041 |
| 15 | 3 | 0.10250 | 1.244 | 0.218 | 0.143 | 0.150 | 0.037 | Test 11 | 0.0014 | -0.1365 | 0.0367 | 4.97 | 5.819 | 0.928 | 7496 | 0.928 | 0.028 | 0.0064 | -0.1381 | 0.03919 | 26.989 | 0.741 | 7496 | 0.741 | 0.06 | 0.001166 | -0.0246 | 0.027 | 0.139 | 0.9725 | 7496 | 0.973 | 0.0043 |
| 7 | 3 | 0.10250 | 1.244 | 0.218 | 0.155 | 0.168 | 0.031 | Test 12 | 0.0002 | 0.1298 | 0.0842 | 4.97 | 46.390 | 0.659 | 7496 | 0.659 | 0.079 | 0.0079 | 0.1326 | 0.08983 | 30.23 | 0.761 | 7496 | 0.761 | 0.0635 | 0.00024 | 0.0306 | 0.003 | 0.139 | 0.9622 | 7496 | 0.962 | 0.0043 |
| 1 | 3 | 0.10250 | 1.244 | 0.218 | 0.144 | 0.157 | 0.027 | Test 13 | 0.0046 | 0.1258 | -0.0607 | 4.97 | 24.939 | 0.746 | 7496 | 0.746 | 0.058 | 0.0094 | 0.136 | -0.0569 | 58.876 | 0.581 | 7496 | 0.58 | 0.0886 | 0.000605 | 0.02135 | -0.016 | 0.076 | 0.972 | 7496 | 0.972 | 0.0032 |
| 1 | 5 | 0.10250 | 1.244 | 0.218 | 0.437 | 0.157 | 0.027 | Test 14 | 0.3050 | -0.1227 | -0.0487 | 4.96 | 988.740 | 0.062 | 7496 | 0.062 | 0.363 | -0.018 | -0.1302 | -0.0474 | 179.53 | 0.286 | 7496 | 0.286 | 0.1548 | 0.000585 | -0.0261 | 0.005 | 0.077 | 0.9716 | 7496 | 0.972 | 0.0032 |
| 7 | 5 | 0.10250 | 1.244 | 0.218 | 0.168 | 0.164 | 0.031 | Test 15 | 0.0051 | -0.1043 | 0.1254 | 4.97 | 165.648 | 0.376 | 7496 | 0.376 | 0.149 | 0.002 | -0.1048 | 0.1242 | 30.127 | 0.767 | 7496 | 0.767 | 0.0634 | 0.000209 | 0.00623 | 0.03 | 0.135 | 0.9632 | 7496 | 0.963 | 0.0042 |
| 15 | 5 | 0.10250 | 1.244 | 0.218 | 0.140 | 0.154 | 0.037 | Test 16 | 0.0032 | 0.0059 | -0.1369 | 4.97 | 42.008 | 0.626 | 7496 | 0.626 | 0.075 | 0.0069 | 0.00488 | -0.1473 | 27.05 | 0.751 | 7496 | 0.751 | 0.0601 | 0.001094 | -0.0206 | -0.03 | 0.141 | 0.9718 | 7496 | 0.972 | 0.0043 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R003 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.14815 | 2.120 | 0.3855 | 0.406 | 0.427 | 0.058 | Test 1 | 0.06989 | -0.0777 | 0.3271 | 2.86 | 151.168 | 0.7372 | 7496 | 0.737 | 0.142 | 0.0605 | -0.1256 | 0.3439 | 92.533 | 0.845 | 7496 | 0.844 | 0.1111 | 0.00052 | -0.0557 | 0.013 | 2.54 | 0.8279 | 7496 | 0.828 | 0.0184 |
| 7 | 1 | 0.14815 | 2.120 | 0.3855 | 0.470 | 0.432 | 0.052 | Test 2 | 0.03845 | -0.1321 | 0.4111 | 2.86 | 98.68 | 0.8763 | 7496 | 0.876 | 0.1147 | 0.0366 | -0.1174 | 0.3772 | 146.1 | 0.8 | 7496 | 0.8 | 0.1396 | 0.000559 | -0.0491 | 0.015 | 2.819 | 0.7778 | 7496 | 0.778 | 0.0194 |
| 5 | 1 | 0.14815 | 2.120 | 0.3855 | 0.455 | 0.393 | 0.054 | Test 3 | 0.04111 | 0.2908 | 0.2949 | 2.86 | 120.272 | 0.8425 | 7496 | 0.842 | 0.1267 | 0.0329 | 0.2629 | 0.2468 | 193.09 | 0.716 | 7496 | 0.716 | 0.1605 | 0.000549 | -0.0098 | 0.052 | 2.749 | 0.7944 | 7496 | 0.794 | 0.0192 |
| 3 | 1 | 0.14815 | 2.120 | 0.3855 | 0.435 | 0.406 | 0.056 | Test 4 | 0.05037 | 0.3334 | 0.1924 | 2.86 | 107.155 | 0.8383 | 7496 | 0.838 | 0.1196 | 0.0454 | 0.3043 | 0.1932 | 163.38 | 0.749 | 7496 | 0.749 | 0.1476 | 0.00042 | 0.00483 | 0.055 | 2.621 | 0.8134 | 7496 | 0.813 | 0.0187 |
| 9 | 1 | 0.14815 | 2.120 | 0.3855 | 0.463 | 0.429 | 0.050 | Test 5 | 0.02924 | -0.2527 | 0.3526 | 2.86 | 132.796 | 0.8416 | 7496 | 0.842 | 0.1331 | 0.0299 | -0.2308 | 0.3256 | 146.71 | 0.803 | 7496 | 0.803 | 0.1399 | 0.000355 | -0.0495 | 0.001 | 2.755 | 0.7696 | 7496 | 0.77 | 0.0192 |
| 11 | 1 | 0.14815 | 2.120 | 0.3855 | 0.413 | 0.426 | 0.048 | Test 6 | 0.00933 | 0.3769 | 0.1451 | 2.86 | 291.605 | 0.6772 | 7496 | 0.677 | 0.1972 | 0.0306 | 0.3638 | 0.1538 | 148.65 | 0.797 | 7496 | 0.797 | 0.1408 | 0.000315 | 0.01357 | 0.045 | 2.785 | 0.7513 | 7496 | 0.751 | 0.0193 |
| 13 | 1 | 0.14815 | 2.120 | 0.3855 | 0.437 | 0.399 | 0.046 | Test 7 | 0.01549 | 0.2682 | -0.3258 | 2.86 | 155.78 | 0.8108 | 7496 | 0.811 | 0.1442 | 0.0213 | 0.25 | -0.2834 | 165.93 | 0.763 | 7496 | 0.763 | 0.1488 | 0.000417 | 0.04529 | -6E-04 | 2.835 | 0.7307 | 7496 | 0.731 | 0.0194 |
| 15 | 1 | 0.14815 | 2.120 | 0.3855 | 0.423 | 0.334 | 0.044 | Test 8 | 0.00708 | 0.3291 | 0.2541 | 2.86 | 151.187 | 0.8109 | 7496 | 0.811 | 0.142 | 0.0007 | 0.2549 | 0.2149 | 232.94 | 0.642 | 7496 | 0.641 | 0.1763 | 0.000477 | 0.00128 | 0.043 | 2.855 | 0.71 | 7496 | 0.71 | 0.0195 |
| 17 | 1 | 0.14815 | 2.120 | 0.3855 | 0.395 | 0.310 | 0.042 | Test 9 | -0.01571 | -0.3238 | -0.1984 | 2.86 | 207.332 | 0.7229 | 7496 | 0.723 | 0.1663 | -0.026 | -0.2325 | -0.1617 | 315.37 | 0.488 | 7496 | 0.488 | 0.2051 | 0.000463 | 0.00571 | -0.041 | 2.887 | 0.6908 | 7496 | 0.691 | 0.0196 |
| 17 | 3 | 0.14815 | 2.120 | 0.3855 | 0.407 | 0.375 | 0.042 | Test 10 | 0.02073 | 0.118 | 0.3681 | 2.86 | 129.017 | 0.8128 | 7496 | 0.813 | 0.1312 | 0.0204 | 0.1035 | 0.3388 | 138.65 | 0.773 | 7496 | 0.772 | 0.136 | 0.00052 | -0.0199 | 0.036 | 2.914 | 0.6869 | 7496 | 0.687 | 0.0197 |
| 15 | 3 | 0.14815 | 2.120 | 0.3855 | 0.423 | 0.385 | 0.044 | Test 11 | 0.02314 | 0.3641 | -0.1643 | 2.86 | 107.877 | 0.8473 | 7496 | 0.847 | 0.12 | 0.0234 | 0.3375 | -0.1307 | 140.1 | 0.778 | 7496 | 0.778 | 0.1367 | 0.000428 | 0.04055 | 0.015 | 2.828 | 0.7141 | 7496 | 0.714 | 0.0194 |
| 13 | 3 | 0.14815 | 2.120 | 0.3855 | 0.427 | 0.425 | 0.046 | Test 12 | 0.03356 | 0.08694 | -0.3837 | 2.86 | 136.54 | 0.8095 | 7496 | 0.809 | 0.135 | 0.0368 | 0.09593 | -0.376 | 91.513 | 0.861 | 7496 | 0.861 | 0.1105 | 0.000265 | 0.03924 | -0.023 | 2.776 | 0.7379 | 7496 | 0.738 | 0.0192 |
| 11 | 3 | 0.14815 | 2.120 | 0.3855 | 0.423 | 0.431 | 0.048 | Test 13 | 0.03723 | 0.3093 | -0.2303 | 2.86 | 204.622 | 0.7315 | 7496 | 0.731 | 0.1652 | 0.0392 | 0.3061 | -0.2441 | 71.668 | 0.889 | 7496 | 0.889 | 0.0978 | 0.000235 | 0.04696 | 0.009 | 2.745 | 0.7568 | 7496 | 0.757 | 0.0191 |
| 9 | 3 | 0.14815 | 2.120 | 0.3855 | 0.413 | 0.431 | 0.050 | Test 14 | 0.04093 | 0.1901 | 0.3197 | 2.86 | 210.071 | 0.7118 | 7496 | 0.712 | 0.1674 | 0.0423 | 0.2165 | 0.323 | 72.811 | 0.886 | 7496 | 0.886 | 0.0986 | 0.000331 | -0.015 | 0.047 | 2.739 | 0.77 | 7496 | 0.77 | 0.0191 |
| 7 | 3 | 0.14815 | 2.120 | 0.3855 | 0.414 | 0.421 | 0.052 | Test 15 | 0.03738 | 0.239 | 0.2912 | 2.86 | 117.7 | 0.8189 | 7496 | 0.819 | 0.1253 | 0.0426 | 0.2442 | 0.2897 | 96.612 | 0.848 | 7496 | 0.848 | 0.1135 | 0.000427 | -0.011 | 0.05 | 2.753 | 0.7827 | 7496 | 0.783 | 0.0192 |
| 5 | 3 | 0.14815 | 2.120 | 0.3855 | 0.405 | 0.336 | 0.054 | Test 16 | 0.0392 | -0.2 | 0.306 | 2.86 | 156.128 | 0.7779 | 7992 | 0.778 | 0.1398 | 0.015 | -0.156 | 0.28 | 235.02 | 0.647 | 7992 | 0.647 | 0.1715 | 0.000506 | -0.0527 | 0.008 | 2.898 | 0.7969 | 7992 | 0.797 | 0.019 |
| 3 | 3 | 0.14815 | 2.120 | 0.3855 | 0.402 | 0.403 | 0.056 | Test 17 | 0.0389 | -0.157 | 0.327 | 2.86 | 99.6314 | 0.8346 | 7608 | 0.835 | 0.1144 | 0.0499 | -0.15 | 0.32 | 91.886 | 0.841 | 7608 | 0.841 | 0.1099 | 0.000365 | -0.0529 | 0.016 | 2.665 | 0.8137 | 7608 | 0.814 | 0.0187 |
| 1 | 3 | 0.14815 | 2.120 | 0.3855 | 0.384 | 0.372 | 0.057 | Test 18 | 0.0293 | 0.254 | -0.247 | 2.86 | 205.133 | 0.6977 | 7496 | 0.698 | 0.1654 | 0.0335 | 0.251 | -0.227 | 136.48 | 0.76 | 7496 | 0.76 | 0.1349 | 0.000262 | 0.0569 | 0.005 | 2.529 | 0.8287 | 7496 | 0.829 | 0.0184 |
| 1 | 5 | 0.14815 | 2.120 | 0.3855 | 0.293 | 0.327 | 0.057 | Test 19 | 0.0036 | -0.289 | 0.02 | 2.86 | 568.391 | 0.449 | 11000 | 0.449 | 0.2273 | 0.065 | -0.26 | -0.0361 | 548.49 | 0.409 | 11000 | 0.409 | 0.2233 | 0.000249 | -0.0367 | -0.044 | 3.731 | 0.8282 | 11000 | 0.828 | 0.0184 |
| 3 | 5 | 0.14815 | 2.120 | 0.3855 | 0.383 | 0.359 | 0.055 | Test 20 | 0.0435 | -0.0152 | 0.339 | 2.86 | 122.351 | 0.7794 | 7496 | 0.779 | 0.1278 | 0.0236 | -0.00846 | 0.335 | 214.29 | 0.664 | 7496 | 0.664 | 0.1691 | 0.000329 | -0.045 | 0.032 | 2.631 | 0.8128 | 7496 | 0.813 | 0.0187 |
| 5 | 5 | 0.14815 | 2.120 | 0.3855 | 0.322 | 0.431 | 0.054 | Test 21 | 0.017 | -0.264 | -0.152 | 2.86 | 306.755 | 0.5322 | 7496 | 0.532 | 0.2023 | -0.024 | -0.348 | -0.211 | 717.99 | 0.465 | 7496 | 0.465 | 0.3095 | 0.000489 | -0.0067 | -0.053 | 2.76 | 0.7935 | 7496 | 0.793 | 0.0192 |
| 7 | 5 | 0.14815 | 2.120 | 0.3855 | 0.327 | 0.414 | 0.052 | Test 22 | 0.0411 | 0.136 | -0.251 | 2.86 | 544.136 | 0.3607 | 7496 | 0.361 | 0.2694 | 0.0452 | 0.161 | -0.332 | 144.93 | 0.779 | 7496 | 0.779 | 0.139 | 0.000411 | 0.0492 | -0.014 | 2.78 | 0.7812 | 7496 | 0.781 | 0.0193 |
| 9 | 5 | 0.14815 | 2.120 | 0.3855 | 0.380 | 0.433 | 0.049 | Test 23 | 0.039 | 0.33 | 0.084 | 2.86 | 539.907 | 0.4559 | 7496 | 0.456 | 0.2684 | 0.0428 | 0.382 | 0.0785 | 65.989 | 0.896 | 7496 | 0.896 | 0.0938 | 0.000242 | 0.0249 | 0.042 | 2.754 | 0.7686 | 7496 | 0.769 | 0.0192 |
| 11 | 5 | 0.14815 | 2.120 | 0.3855 | 0.444 | 0.429 | 0.047 | Test 24 | 0.04 | 0.231 | 0.332 | 2.86 | 24.3153 | 0.962 | 7496 | 0.962 | 0.057 | 0.034 | 0.223 | 0.326 | 43.495 | 0.931 | 7496 | 0.931 | 0.0762 | 0.000192 | -0.0107 | 0.046 | 2.76 | 0.7527 | 7496 | 0.753 | 0.0192 |
| 13 | 5 | 0.14815 | 2.120 | 0.3855 | 0.440 | 0.326 | 0.046 | Test 25 | 0.0392 | 0.353 | 0.19 | 2.86 | 93.3145 | 0.8664 | 7496 | 0.866 | 0.1116 | 0.0022 | 0.278 | 0.165 | 239.74 | 0.621 | 7496 | 0.621 | 0.1788 | 0.000153 | 0.0136 | 0.043 | 2.776 | 0.7362 | 7496 | 0.736 | 0.0192 |
| 15 | 5 | 0.14815 | 2.120 | 0.3855 | 0.446 | 0.404 | 0.043 | Test 26 | 0.0383 | 0.114 | -0.391 | 2.86 | 34.9175 | 0.947 | 7496 | 0.947 | 0.0683 | 0.0287 | 0.116 | -0.357 | 96.012 | 0.847 | 7496 | 0.847 | 0.1132 | 0.00022 | 0.037 | -0.022 | 2.794 | 0.7172 | 7496 | 0.717 | 0.0193 |

| Location |  | Loading Parameters |  |  | Resultant Max. |  |  | Test | Coefficient for Vx1 |  |  |  | Goodness of fit parameters |  |  |  |  | Coefficient for Vx2 |  |  | Goodness of fit parameters |  |  |  |  | Coefficient for WL |  |  | Goodness of fit parameters |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | 5 | 0.14815 | 2.120 | 0.3855 | 0.437 | 0.393 | 0.042 | Test 27 | 0.0327 | 0.0481 | 0.401 | 2.86 | 43.8687 | 0.9332 | 7496 | 0.933 | 0.0765 | 0.0259 | 0.034 | 0.366 | 107.58 | 0.826 | 7496 | 0.826 | 0.1198 | 0.000262 | -0.0239 | 0.034 | 2.824 | 0.6959 | 7496 | 0.696 | 0.0194 |
| 17 | 7 | 0.14815 | 2.120 | 0.3855 | 0.432 | 0.312 | 0.042 | Test 28 | 0.0318 | 0.328 | 0.23 | 2.86 | 42.3362 | 0.9346 | 7496 | 0.935 | 0.0752 | -0.043 | 0.21 | 0.169 | 371.52 | 0.432 | 7496 | 0.432 | 0.2226 | 0.000283 | 0.00785 | 0.041 | 2.822 | 0.6957 | 7496 | 0.696 | 0.0194 |
| 15 | 7 | 0.14815 | 2.120 | 0.3855 | 0.420 | 0.406 | 0.044 | Test 29 | 0.03 | 0.131 | 0.367 | 2.86 | 83.6186 | 0.8746 | 7656 | 0.875 | 0.1045 | 0.0259 | 0.129 | 0.358 | 88.759 | 0.863 | 7656 | 0.863 | 0.1077 | 0.00019 | -0.0201 | 0.039 | 2.862 | 0.7179 | 7656 | 0.718 | 0.0193 |
| 13 | 7 | 0.14815 | 2.120 | 0.3855 | 0.413 | 0.410 | 0.047 | Test 30 | 0.0328 | -0.228 | 0.304 | 2.86 | 101.798 | 0.8425 | 7496 | 0.842 | 0.1165 | 0.0301 | -0.231 | 0.302 | 94.687 | 0.852 | 7496 | 0.852 | 0.1124 | -0.0014 | -0.0446 | 0.008 | 2.861 | 0.7295 | 7496 | 0.729 | 0.0195 |
| 11 | 7 | 0.14815 | 2.120 | 0.3855 | 0.282 | 0.410 | 0.049 | Test 31 | 0.025 | -0.178 | -0.186 | 2.86 | 557.072 | 0.31 | 7496 | 0.31 | 0.2726 | 0.0342 | -0.271 | -0.26 | 104.6 | 0.836 | 7496 | 0.836 | 0.1181 | -0.00158 | 0.00082 | -0.047 | 2.721 | 0.7529 | 7496 | 0.753 | 0.0191 |
| 9 | 7 | 0.14815 | 2.120 | 0.3855 | 0.428 | 0.367 | 0.050 | Test 32 | 0.0478 | -0.299 | 0.235 | 2.86 | 122.742 | 0.8162 | 7496 | 0.816 | 0.128 | 0.0435 | -0.268 | 0.182 | 294.56 | 0.573 | 7496 | 0.572 | 0.1982 | -0.0016 | -0.0483 | -0.007 | 2.639 | 0.7725 | 7496 | 0.772 | 0.0188 |
| 7 | 7 | 0.14815 | 2.120 | 0.3855 | 0.376 | 0.409 | 0.052 | Test 33 | 0.0304 | -0.327 | -0.111 | 2.86 | 205.375 | 0.6867 | 7496 | 0.687 | 0.1655 | -0.063 | -0.337 | -0.0798 | 537.33 | 0.457 | 7496 | 0.457 | 0.2677 | -0.00144 | -0.0221 | -0.046 | 2.651 | 0.785 | 7496 | 0.785 | 0.0188 |
| 5 | 7 | 0.14815 | 2.120 | 0.3855 | 0.409 | 0.211 | 0.054 | Test 34 | 0.0438 | 0.0852 | 0.355 | 2.86 | 66.7903 | 0.8823 | 7496 | 0.882 | 0.0944 | -0.066 | 0.0453 | 0.138 | 739.47 | 0.097 | 7496 | 0.096 | 0.3141 | -0.00142 | -0.0287 | 0.044 | 2.604 | 0.7992 | 7496 | 0.799 | 0.0186 |
| 3 | 7 | 0.14815 | 2.120 | 0.3855 | 0.326 | 0.314 | 0.056 | Test 35 | 0.016 | -0.22 | -0.218 | 2.86 | 354.847 | 0.5041 | 7496 | 0.504 | 0.2176 | 0.0172 | -0.209 | -0.211 | 409.17 | 0.449 | 7496 | 0.448 | 0.2336 | -0.00153 | 0.0043 | -0.054 | 2.539 | 0.8149 | 7496 | 0.815 | 0.0184 |
| 1 | 7 | 0.14815 | 2.120 | 0.3855 | 0.263 | 0.292 | 0.058 | Test 36 | -0.00431 | -0.123 | 0.228 | 2.86 | 484.613 | 0.3433 | 7496 | 0.343 | 0.2543 | -0.005 | -0.12 | 0.26 | 510.01 | 0.377 | 7496 | 0.377 | 0.2608 | -0.00166 | -0.0548 | 0.014 | 2.451 | 0.8303 | 7496 | 0.83 | 0.0181 |
| 1 | 9 | 0.14815 | 2.120 | 0.3855 | 0.349 | 0.289 | 0.058 | Test 37 | 0.0256 | -0.1 | -0.308 | 2.86 | 181.266 | 0.6876 | 7496 | 0.688 | 0.1555 | -0.013 | -0.0798 | -0.264 | 335.17 | 0.46 | 7496 | 0.46 | 0.2115 | -0.0017 | 0.0317 | -0.047 | 2.431 | 0.8318 | 7496 | 0.832 | 0.018 |
| 3 | 9 | 0.14815 | 2.120 | 0.3855 | 0.318 | 0.359 | 0.056 | Test 38 | 0.00412 | -0.092 | 0.3 | 2.86 | 645.021 | 0.367 | 7496 | 0.367 | 0.2933 | 0.02 | -0.111 | 0.32 | 157.71 | 0.732 | 7496 | 0.732 | 0.145 | -0.0015 | -0.0508 | 0.019 | 2.517 | 0.8161 | 7496 | 0.816 | 0.0183 |
| 5 | 9 | 0.14815 | 2.120 | 0.3855 | 0.391 | 0.240 | 0.054 | Test 39 | 0.0374 | -0.342 | -0.09 | 2.86 | 107.297 | 0.8155 | 7496 | 0.816 | 0.1196 | -0.032 | -0.194 | -0.0753 | 515.09 | 0.24 | 7496 | 0.24 | 0.2621 | -0.00143 | -0.0197 | -0.049 | 2.629 | 0.7976 | 7496 | 0.798 | 0.0187 |
| 7 | 9 | 0.14815 | 2.120 | 0.3855 | 0.386 | 0.308 | 0.052 | Test 40 | 0.0332 | -0.222 | 0.274 | 2.86 | 199.404 | 0.7013 | 7496 | 0.701 | 0.1631 | 0.0366 | -0.177 | 0.206 | 580.6 | 0.323 | 7496 | 0.323 | 0.2783 | -0.00151 | -0.0508 | 0.002 | 2.656 | 0.7856 | 7496 | 0.786 | 0.0188 |
| 9 | 9 | 0.14815 | 2.120 | 0.3855 | 0.401 | 0.361 | 0.050 | Test 41 | 0.0351 | -0.324 | 0.17 | 2.86 | 150.719 | 0.7695 | 7496 | 0.769 | 0.1418 | 0.0273 | -0.294 | 0.157 | 302.11 | 0.581 | 7496 | 0.581 | 0.2008 | -0.00162 | -0.0451 | -0.019 | 2.699 | 0.7684 | 7496 | 0.768 | 0.019 |
| 11 | 9 | 0.14815 | 2.120 | 0.3855 | 0.429 | 0.341 | 0.048 | Test 42 | 0.0428 | 0.38 | -0.0703 | 2.86 | 52.6423 | 0.9142 | 7496 | 0.914 | 0.0838 | -0.003 | 0.334 | -0.0505 | 206.78 | 0.675 | 7496 | 0.675 | 0.1661 | -0.00165 | 0.0373 | 0.028 | 2.729 | 0.7516 | 7496 | 0.752 | 0.0191 |
| 13 | 9 | 0.14815 | 2.120 | 0.3855 | 0.429 | 0.354 | 0.046 | Test 43 | 0.0406 | 0.0405 | 0.386 | 2.86 | 58.4191 | 0.9063 | 7496 | 0.906 | 0.0883 | 0.0006 | 0.0276 | 0.352 | 165.13 | 0.739 | 7496 | 0.739 | 0.1484 | -0.00162 | -0.029 | 0.034 | 2.762 | 0.7342 | 7496 | 0.734 | 0.0192 |
| 15 | 9 | 0.14815 | 2.120 | 0.3855 | 0.426 | 0.392 | 0.040 | Test 44 | 0.0374 | -0.0818 | -0.38 | 2.86 | 63.2906 | 0.9 | 7496 | 0.9 | 0.0919 | 0.009 | -0.0919 | -0.372 | 65.274 | 0.894 | 7496 | 0.894 | 0.0933 | -0.0015 | 0.0234 | -0.03 | 2.767 | 0.7145 | 7496 | 0.714 | 0.0192 |
| 17 | 9 | 0.14815 | 2.120 | 0.3855 | 0.364 | 0.383 | 0.042 | Test 45 | 0.0208 | 0.343 | 0.0199 | 2.86 | 433.037 | 0.506 | 7496 | 0.506 | 0.2404 | 0.006 | 0.377 | 0.0123 | 81.998 | 0.867 | 7496 | 0.867 | 0.1046 | -0.00152 | 0.028 | 0.029 | 2.782 | 0.6936 | 7496 | 0.694 | 0.0193 |
| 17 | 11 | 0.14815 | 2.120 | 0.3855 | 0.422 | 0.397 | 0.042 | Test 46 | 0.0311 | 0.378 | -0.1 | 2.86 | 52.7386 | 0.9162 | 7496 | 0.916 | 0.0839 | -0.009 | 0.373 | -0.105 | 65.922 | 0.895 | 7496 | 0.895 | 0.0938 | -0.00147 | 0.0371 | 0.017 | 2.815 | 0.6911 | 7496 | 0.691 | 0.0194 |
| 15 | 11 | 0.14815 | 2.120 | 0.3855 | 0.426 | 0.392 | 0.045 | Test 47 | 0.0329 | -0.0159 | -0.393 | 2.86 | 52.3297 | 0.9176 | 7496 | 0.918 | 0.0836 | -0.006 | 0.0464 | -0.383 | 73.555 | 0.884 | 7496 | 0.884 | 0.0991 | -0.00166 | 0.0272 | -0.033 | 2.76 | 0.7161 | 7496 | 0.716 | 0.0192 |
| 13 | 11 | 0.14815 | 2.120 | 0.3855 | 0.425 | 0.375 | 0.047 | Test 48 | 0.0323 | 0.366 | 0.142 | 2.86 | 51.5299 | 0.9183 | 7496 | 0.918 | 0.0829 | -0.001 | 0.343 | 0.149 | 109.47 | 0.828 | 7496 | 0.828 | 0.1208 | -0.00165 | 0.0201 | 0.04 | 2.764 | 0.7336 | 7496 | 0.734 | 0.0192 |
| 11 | 11 | 0.14815 | 2.120 | 0.3855 | 0.426 | 0.372 | 0.049 | Test 49 | 0.0361 | 0.39 | -0.00184 | 2.86 | 51.8412 | 0.917 | 7496 | 0.917 | 0.0832 | 0.0019 | 0.37 | -0.0035 | 107.6 | 0.829 | 7496 | 0.829 | 0.1198 | -0.00172 | 0.0322 | 0.034 | 2.733 | 0.7528 | 7496 | 0.753 | 0.0191 |
| 9 | 11 | 0.14815 | 2.120 | 0.3855 | 0.417 | 0.365 | 0.051 | Test 50 | 0.0349 | -0.0869 | 0.372 | 2.86 | 59.8085 | 0.9018 | 7496 | 0.902 | 0.0893 | -0.006 | -0.055 | 0.354 | 148.67 | 0.765 | 7496 | 0.764 | 0.1408 | -0.00171 | -0.0419 | 0.025 | 2.706 | 0.7687 | 7496 | 0.769 | 0.019 |
| 7 | 11 | 0.14815 | 2.120 | 0.3855 | 0.404 | 0.352 | 0.052 | Test 51 | 0.0325 | 0.249 | -0.276 | 2.86 | 78.84 | 0.8684 | 7496 | 0.868 | 0.1026 | -0.005 | 0.227 | -0.263 | 165.9 | 0.733 | 7496 | 0.733 | 0.1488 | -0.00162 | 0.05 | -0.002 | 2.704 | 0.7826 | 7496 | 0.783 | 0.019 |
| 5 | 11 | 0.14815 | 2.120 | 0.3855 | 0.395 | 0.338 | 0.054 | Test 52 | 0.03 | 0.168 | -0.324 | 2.86 | 91.8262 | 0.8451 | 7496 | 0.845 | 0.1107 | -0.003 | 0.159 | -0.294 | 202.99 | 0.675 | 7496 | 0.674 | 0.1646 | -0.00169 | 0.0512 | -0.011 | 2.632 | 0.7975 | 7496 | 0.797 | 0.0187 |
| 3 | 11 | 0.14815 | 2.120 | 0.3855 | 0.375 | 0.315 | 0.055 | Test 53 | 0.0259 | 0.0253 | -0.348 | 2.86 | 114.728 | 0.7995 | 7496 | 0.8 | 0.1237 | -0.026 | 0.0209 | -0.289 | 292.4 | 0.519 | 7496 | 0.519 | 0.1975 | -0.00179 | 0.042 | -0.033 | 2.543 | 0.8144 | 7496 | 0.814 | 0.0184 |
| 1 | 11 | 0.14815 | 2.120 | 0.3855 | 0.328 | 0.317 | 0.058 | Test 54 | 0.0145 | -0.102 | -0.296 | 2.86 | 359.066 | 0.5066 | 7496 | 0.506 | 0.2189 | 0.0193 | -0.0982 | -0.281 | 689.45 | 0.326 | 7496 | 0.326 | 0.3033 | -0.0019 | 0.0292 | -0.048 | 2.444 | 0.8303 | 7496 | 0.83 | 0.0181 |
| 1 | 13 | 0.14815 | 2.120 | 0.3855 | 0.325 | 0.300 | 0.058 | Test 55 | -0.00845 | 0.206 | -0.24 | 2.86 | 252.646 | 0.5988 | 7489 | 0.599 | 0.1837 | -0.071 | 0.145 | -0.177 | 424.07 | 0.318 | 7489 | 0.317 | 0.238 | -0.00191 | 0.0555 | -0.011 | 2.444 | 0.8308 | 7489 | 0.831 | 0.0181 |
| 7 | 13 | 0.14815 | 2.120 | 0.3855 | 0.383 | 0.366 | 0.053 | Test 56 | 0.0139 | -0.326 | 0.173 | 2.86 | 131.662 | 0.7955 | 7489 | 0.795 | 0.1326 | -0.032 | -0.29 | 0.166 | 241.37 | 0.636 | 7489 | 0.636 | 0.1795 | -0.00168 | -0.0495 | -0.012 | 2.715 | 0.782 | 7489 | 0.782 | 0.019 |
| 15 | 13 | 0.14815 | 2.120 | 0.3855 | 0.409 | 0.400 | 0.045 | Test 57 | 0.0235 | -0.2 | -0.33 | 2.86 | 96.7743 | 0.8562 | 7489 | 0.856 | 0.1137 | -0.022 | -0.2 | -0.32 | 109.78 | 0.834 | 7489 | 0.834 | 0.1211 | -0.00182 | 0.00984 | -0.042 | 2.768 | 0.7168 | 7489 | 0.717 | 0.0192 |
| 15 | 15 | 0.14815 | 2.120 | 0.3855 | 0.395 | 0.410 | 0.045 | Test 58 | 0.00977 | -0.29 | -0.254 | 2.86 | 129.773 | 0.8114 | 7489 | 0.811 | 0.1316 | -0.046 | -0.275 | -0.239 | 196.98 | 0.717 | 7489 | 0.717 | 0.1622 | -0.00179 | -0.008 | -0.043 | 2.776 | 0.7163 | 7489 | 0.716 | 0.0193 |
| 7 | 15 | 0.14815 | 2.120 | 0.3855 | 0.370 | 0.380 | 0.052 | Test 59 | -0.00624 | -0.363 | -0.0212 | 2.86 | 181.219 | 0.7328 | 7489 | 0.733 | 0.1556 | -0.057 | -0.322 | -0.0253 | 311.21 | 0.557 | 7489 | 0.557 | 0.2039 | -0.00174 | -0.0358 | -0.036 | 2.704 | 0.7805 | 7489 | 0.78 | 0.019 |
| 1 | 15 | 0.14815 | 2.120 | 0.3855 | 0.330 | 0.299 | 0.058 | Test 60 | -0.03 | -0.3 | -0.00545 | 2.86 | 320.713 | 0.5446 | 7489 | 0.544 | 0.2069 | -0.089 | -0.21 | 0.00443 | 493.14 | 0.264 | 7489 | 0.263 | 0.2566 | -0.00204 | -0.042 | -0.037 | 2.401 | 0.8342 | 7489 | 0.834 | 0.0179 |
| 1 | 17 | 0.14815 | 2.120 | 0.3855 | 0.368 | 0.318 | 0.059 | Test 61 | -0.0487 | 0.144 | -0.285 | 2.86 | 391.903 | 0.4953 | 7489 | 0.495 | 0.2288 | -0.096 | 0.113 | -0.191 | 549.27 | 0.252 | 7489 | 0.252 | 0.2708 | -0.002 | 0.0499 | -0.027 | 2.425 | 0.8326 | 7489 | 0.833 | 0.018 |
| 7 | 17 | 0.14815 | 2.120 | 0.3855 | 0.388 | 0.358 | 0.052 | Test 62 | -0.0299 | 0.206 | -0.293 | 2.86 | 254.435 | 0.6539 | 7489 | 0.654 | 0.1843 | -0.076 | 0.159 | -0.233 | 475.82 | 0.387 | 7489 | 0.386 | 0.2521 | -0.0018 | 0.0488 | -0.014 | 2.699 | 0.7811 | 7489 | 0.781 | 0.019 |
|  |  | 0.14815 | 2.120 | 0.3855 | 0.395 | 0.424 | 0.045 | Test 63 | -0.011 | -0.33 | -0.196 | 2.86 | 185.664 | 0.7485 | 7489 | 0.748 | 0.1575 | -0.079 | -0.29 | -0.187 | 292.52 | 0.604 | 7489 | 0.604 | 0.1976 | -0.00191 | -0.0151 | -0.04 | 2.759 | 0.7169 | 7489 | 0.717 | 0.0192 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R004 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.15 | 1.898 | 0.2483 | 0.382 | 0.408 | 0.049 | Test 1 | 0.0646 | 0.08818 | -0.305 | 3.31 | 86.6044 | 0.8136 | 7496 | 0.814 | 0.1075 | 0.0577 | 0.1189 | -0.3294 | 72.185 | 0.864 | 7496 | 0.864 | 0.0981 | 0.002922 | 0.04383 | -0.015 | 1.188 | 0.8712 | 7496 | 0.871 | 0.0126 |
| 3 | 1 | 0.15 | 1.898 | 0.2483 | 0.410 | 0.441 | 0.047 | Test 2 | 0.04676 | 0.2703 | 0.2423 | 3.31 | 73.2845 | 0.8708 | 7496 | 0.871 | 0.0989 | 0.0611 | 0.2841 | 0.2526 | 65.759 | 0.892 | 7496 | 0.892 | 0.0937 | 0.002993 | 0.00043 | 0.044 | 1.125 | 0.8635 | 7496 | 0.864 | 0.0122 |
| 5 | 1 | 0.15 | 1.898 | 0.2483 | 0.436 | 0.415 | 0.045 | Test 3 | 0.04536 | -0.3247 | 0.2165 | 3.31 | 55.3782 | 0.9116 | 7496 | 0.912 | 0.086 | 0.0427 | -0.2895 | 0.2345 | 139.74 | 0.788 | 7496 | 0.788 | 0.1365 | 0.002991 | -0.041 | 0.007 | 1.156 | 0.8488 | 7496 | 0.849 | 0.0124 |
| 7 | 1 | 0.15 | 1.898 | 0.2483 | 0.448 | 0.429 | 0.043 | Test 4 | 0.03908 | -0.4017 | 0.07874 | 3.31 | 54.0533 | 0.9208 | 7496 | 0.921 | 0.0849 | 0.0424 | -0.3724 | 0.1051 | 89.369 | 0.863 | 7496 | 0.863 | 0.1092 | 0.002797 | -0.0359 | -0.017 | 1.229 | 0.829 | 7496 | 0.829 | 0.0128 |
| 9 | 1 | 0.15 | 1.898 | 0.2483 | 0.452 | 0.417 | 0.041 | Test 5 | 0.03565 | 0.1008 | -0.4042 | 3.31 | 53.8926 | 0.9235 | 7496 | 0.924 | 0.0848 | 0.0332 | 0.07399 | -0.3764 | 110.92 | 0.833 | 7496 | 0.833 | 0.1216 | 0.002618 | 0.02813 | -0.026 | 1.328 | 0.8062 | 7496 | 0.806 | 0.0133 |
| 11 | 1 | 0.15 | 1.898 | 0.2483 | 0.449 | 0.405 | 0.039 | Test 6 | 0.03395 | 0.2759 | -0.3105 | 3.31 | 69.4867 | 0.903 | 7496 | 0.903 | 0.0963 | 0.0259 | 0.2344 | -0.2986 | 105.8 | 0.836 | 7496 | 0.836 | 0.1188 | 0.002537 | 0.03503 | -0.011 | 1.346 | 0.7888 | 7496 | 0.789 | 0.0134 |
| 13 | 1 | 0.15 | 1.898 | 0.2483 | 0.443 | 0.401 | 0.037 | Test 7 | 0.02971 | 0.38 | 0.1636 | 3.31 | 45.7233 | 0.9335 | 7496 | 0.934 | 0.0781 | 0.0249 | 0.3445 | 0.1499 | 92.246 | 0.852 | 7496 | 0.852 | 0.1109 | 0.002577 | 0.01955 | 0.029 | 1.28 | 0.7793 | 7496 | 0.779 | 0.0131 |
| 15 | 1 | 0.15 | 1.898 | 0.2483 | 0.426 | 0.399 | 0.036 | Test 8 | 0.02144 | 0.114 | -0.388 | 3.31 | 37.2314 | 0.9428 | 7496 | 0.943 | 0.0705 | 0.025 | 0.1145 | -0.3561 | 60.248 | 0.897 | 7496 | 0.897 | 0.0897 | 0.002735 | 0.02417 | -0.022 | 1.179 | 0.7737 | 7496 | 0.774 | 0.0125 |
| 17 | 1 | 0.15 | 1.898 | 0.2483 | 0.401 | 0.367 | 0.034 | Test 9 | 0.01087 | 0.00748 | -0.3904 | 3.31 | 39.3514 | 0.9356 | 7496 | 0.936 | 0.0725 | 0.0161 | 0.01382 | -0.351 | 102.45 | 0.819 | 7496 | 0.819 | 0.1169 | 0.002983 | 0.01455 | -0.028 | 1.187 | 0.757 | 7496 | 0.757 | 0.0126 |
| 17 | 3 | 0.15 | 1.898 | 0.2483 | 0.394 | 0.391 | 0.034 | Test 10 | 0.019 | 0.2337 | 0.293 | 3.31 | 27.8399 | 0.9498 | 7496 | 0.95 | 0.0609 | 0.0267 | 0.2292 | 0.2832 | 41.186 | 0.924 | 7496 | 0.924 | 0.0741 | 0.002992 | 0.00834 | 0.03 | 1.086 | 0.7686 | 7496 | 0.769 | 0.012 |
| 15 | 3 | 0.15 | 1.898 | 0.2483 | 0.407 | 0.399 | 0.036 | Test 11 | 0.02444 | 0.1407 | -0.3557 | 3.31 | 51.9897 | 0.9135 | 7496 | 0.913 | 0.0833 | 0.0271 | 0.1271 | -0.3495 | 40.442 | 0.928 | 7496 | 0.928 | 0.0735 | 0.002865 | 0.0246 | -0.022 | 1.198 | 0.7719 | 7496 | 0.772 | 0.0126 |
| 7 | 3 | 0.15 | 1.898 | 0.2483 | 0.402 | 0.407 | 0.043 | Test 12 | 0.03185 | 0.2427 | -0.2796 | 3.31 | 18.8149 | 0.9647 | 7496 | 0.965 | 0.0501 | 0.0369 | 0.226 | -0.2933 | 38.078 | 0.931 | 7496 | 0.931 | 0.0713 | 0.002852 | 0.03844 | -0.01 | 1.299 | 0.8208 | 7496 | 0.821 | 0.0132 |
| 1 | 3 | 0.15 | 1.898 | 0.2483 | 0.344 | 0.383 | 0.049 | Test 13 | 0.00939 | -0.2577 | 0.2136 | 3.31 | 41.493 | 0.9101 | 7496 | 0.91 | 0.0744 | 0.0373 | -0.2579 | 0.2301 | 56.635 | 0.888 | 7496 | 0.888 | 0.0869 | 0.003042 | -0.0458 | -0.002 | 1.123 | 0.8754 | 7496 | 0.875 | 0.0122 |
| 1 | 5 | 0.15 | 1.898 | 0.2483 | 0.331 | 0.333 | 0.049 | Test 14 | 0.00728 | 0.2058 | 0.2498 | 3.31 | 155.904 | 0.7158 | 7496 | 0.716 | 0.1442 | 0.0091 | 0.2018 | 0.2535 | 151.78 | 0.722 | 7496 | 0.722 | 0.1423 | 0.003065 | 0.00106 | 0.046 | 1.12 | 0.8755 | 7496 | 0.876 | 0.0122 |
| 7 | 5 | 0.15 | 1.898 | 0.2483 | 0.381 | 0.391 | 0.043 | Test 15 | 0.03039 | -0.118 | -0.3304 | 3.31 | 87.7442 | 0.8403 | 7496 | 0.84 | 0.1082 | 0.0233 | -0.1191 | -0.3483 | 41.058 | 0.925 | 7496 | 0.925 | 0.074 | 0.002878 | 0.01109 | -0.038 | 1.296 | 0.821 | 7496 | 0.821 | 0.0131 |
| 15 | 5 | 0.15 | 1.898 | 0.2483 | 0.397 | 0.398 | 0.036 | Test 16 | 0.0228 | 0.1331 | -0.3498 | 3.31 | 172.04 | 0.7533 | 7496 | 0.753 | 0.1515 | 0.0249 | 0.1215 | -0.3528 | 27.344 | 0.95 | 7496 | 0.95 | 0.0604 | 0.002884 | 0.0225 | -0.024 | 1.199 | 0.7704 | 7496 | 0.77 | 0.0126 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R005 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.15332 | 1.550 | 0.3687 | 0.354 | 0.371 | 0.0404 | Test 1 | 0.04901 | 0.2613 | 0.1569 | 4.05 | 124.222 | 0.7372 | 7496 | 0.737 | 0.1287 | 0.0385 | 0.2726 | 0.1895 | 57.902 | 0.877 | 7496 | 0.877 | 0.0879 | 0.004618 | 0.02481 | 0.026 | 0.352 | 0.9316 | 7496 | 0.932 | 0.0069 |
| 3 | 1 | 0.15332 | 1.550 | 0.3687 | 0.357 | 0.402 | 0.0388 | Test 2 | 0.02841 | -0.2442 | 0.2206 | 4.05 | 51.6631 | 0.8871 | 7496 | 0.887 | 0.083 | 0.0464 | -0.2489 | 0.254 | 41.902 | 0.919 | 7496 | 0.919 | 0.0748 | 0.004268 | -0.0283 | 0.02 | 0.35 | 0.9274 | 7496 | 0.927 | 0.0068 |
| 5 | 1 | 0.15332 | 1.550 | 0.3687 | 0.369 | 0.407 | 0.0377 | Test 3 | 0.02018 | -0.335 | 0.09619 | 4.05 | 45.0223 | 0.9101 | 7496 | 0.91 | 0.0775 | 0.0386 | -0.346 | 0.126 | 37.065 | 0.932 | 7496 | 0.932 | 0.0703 | 0.004143 | -0.0327 | 0.008 | 0.294 | 0.9349 | 7496 | 0.935 | 0.0063 |
| 7 | 1 | 0.15332 | 1.550 | 0.3687 | 0.376 | 0.398 | 0.0373 | Test 4 | 0.01995 | -0.1739 | 0.3103 | 4.05 | 50.97 | 0.903 | 7496 | 0.903 | 0.0825 | 0.0257 | -0.1559 | 0.3384 | 33.799 | 0.939 | 7496 | 0.939 | 0.0671 | 0.004014 | -0.0182 | 0.028 | 0.29 | 0.9347 | 7496 | 0.935 | 0.0062 |
| 9 | 1 | 0.15332 | 1.550 | 0.3687 | 0.385 | 0.383 | 0.0372 | Test 5 | 0.02295 | -0.2149 | 0.2918 | 4.05 | 39.2944 | 0.9261 | 7496 | 0.926 | 0.0724 | 0.0185 | -0.2157 | 0.294 | 35.882 | 0.933 | 7496 | 0.933 | 0.0692 | 0.003792 | -0.0164 | 0.029 | 0.305 | 0.932 | 7496 | 0.932 | 0.0064 |
| 11 | 1 | 0.15332 | 1.550 | 0.3687 | 0.376 | 0.360 | 0.0374 | Test 6 | 0.01501 | 0.3024 | 0.1965 | 4.05 | 41.2044 | 0.9221 | 7496 | 0.922 | 0.0741 | 0.0059 | 0.3002 | 0.1879 | 25.504 | 0.949 | 7496 | 0.949 | 0.0583 | 0.003537 | 0.0312 | 0.013 | 0.348 | 0.9251 | 7496 | 0.925 | 0.0068 |
| 13 | 1 | 0.15332 | 1.550 | 0.3687 | 0.369 | 0.347 | 0.0381 | Test 7 | 0.01263 | 0.3052 | 0.1849 | 4.05 | 28.7966 | 0.9431 | 7496 | 0.943 | 0.062 | 0.0052 | 0.2949 | 0.1734 | 20.762 | 0.955 | 7496 | 0.955 | 0.0526 | -0.00322 | 0.03361 | 0.009 | 0.412 | 0.9173 | 7496 | 0.917 | 0.0074 |

| Location | Loading Parameters | | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 1 | 0.15332 | 1.550 | 0.3687 | 0.349 | 0.329 | 0.039 | Test 8 | 0.00592 | 0.3421 | 0.03017 | 4.05 | 25.8773 | 0.9447 | 7496 | 0.945 | 0.0588 | 0.002 | 0.3251 | 0.03418 | 15.905 | 0.962 | 7496 | 0.962 | 0.0461 | 0.002909 | 0.03495 | 0.009 | 0.482 | 0.9103 | 7496 | 0.91 | 0.008 |
| 17 | 1 | 0.15332 | 1.550 | 0.3687 | 0.332 | 0.311 | 0.0401 | Test 9 | 0.00337 | -0.2893 | 0.1569 | 4.05 | 28.9798 | 0.9334 | 7496 | 0.933 | 0.0622 | 0.0012 | -0.2757 | 0.1411 | 33.775 | 0.914 | 7496 | 0.914 | 0.0671 | 0.002605 | -0.024 | 0.029 | 0.552 | 0.9053 | 7496 | 0.905 | 0.0086 |
| 17 | 3 | 0.15332 | 1.550 | 0.3687 | 0.320 | 0.328 | 0.0401 | Test 10 | 0.0006 | -0.2106 | -0.2402 | 4.05 | 88.2878 | 0.8126 | 7496 | 0.813 | 0.1085 | 0.011 | -0.2011 | -0.2445 | 35.261 | 0.914 | 7496 | 0.914 | 0.0686 | 0.002592 | -0.0354 | -0.012 | 0.547 | 0.9062 | 7496 | 0.906 | 0.0085 |
| 15 | 3 | 0.15332 | 1.550 | 0.3687 | 0.346 | 0.335 | 0.0389 | Test 11 | 0.0172 | -0.1443 | -0.2952 | 4.05 | 144.364 | 0.7372 | 7496 | 0.737 | 0.1388 | 0.0094 | -0.131 | -0.2984 | 28.732 | 0.933 | 7496 | 0.933 | 0.0619 | 0.002934 | -0.0283 | -0.022 | 0.469 | 0.912 | 7496 | 0.912 | 0.0079 |
| 7 | 3 | 0.15332 | 1.550 | 0.3687 | 0.333 | 0.345 | 0.0373 | Test 12 | -0.01121 | -0.3005 | -0.1143 | 4.05 | 161.826 | 0.7054 | 7496 | 0.705 | 0.1469 | 0.0095 | -0.3225 | -0.0928 | 26.915 | 0.94 | 7496 | 0.94 | 0.0599 | 0.004091 | -0.0315 | -0.011 | 0.264 | 0.9398 | 7496 | 0.94 | 0.0059 |
| 1 | 3 | 0.15332 | 1.550 | 0.3687 | 0.321 | 0.341 | 0.0405 | Test 13 | -0.02201 | 0.03239 | -0.2977 | 4.05 | 86.7586 | 0.795 | 7496 | 0.795 | 0.1076 | 0.0147 | 0.03682 | -0.3239 | 49.567 | 0.889 | 7496 | 0.889 | 0.0813 | 0.004352 | 0.00942 | -0.035 | 0.359 | 0.9317 | 7496 | 0.932 | 0.0069 |
| 1 | 5 | 0.15332 | 1.550 | 0.3687 | 0.376 | 0.271 | 0.0404 | Test 14 | -0.134 | 0.01168 | -0.2413 | 4.05 | 630.405 | 0.2577 | 7496 | 0.257 | 0.29 | 0.0225 | 0.08777 | -0.2324 | 472.68 | 0.329 | 7496 | 0.328 | 0.2511 | 0.004343 | 0.01647 | -0.032 | 0.365 | 0.9304 | 7496 | 0.93 | 0.007 |
| 7 | 5 | 0.15332 | 1.550 | 0.3687 | 0.290 | 0.339 | 0.0373 | Test 15 | 0.00189 | 0.258 | -0.1274 | 4.05 | 379.944 | 0.4497 | 7496 | 0.45 | 0.2251 | 0.0162 | 0.2762 | -0.1669 | 162.4 | 0.706 | 7496 | 0.706 | 0.1472 | 0.004058 | 0.02808 | -0.018 | 0.261 | 0.9406 | 7496 | 0.941 | 0.0059 |
| 15 | 5 | 0.15332 | 1.550 | 0.3687 | 0.328 | 0.336 | 0.039 | Test 16 | 0.03793 | 0.2106 | -0.1991 | 4.05 | 282.168 | 0.5274 | 7496 | 0.527 | 0.194 | 0.0146 | 0.2322 | -0.2225 | 145.1 | 0.728 | 7496 | 0.728 | 0.1391 | 0.002893 | 0.01548 | -0.033 | 0.464 | 0.9133 | 7496 | 0.913 | 0.0079 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R006 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.17552 | 2.439 | 0.4649 | 0.430 | 0.411 | 0.0759 | Test 1 | 0.1024 | -0.1092 | -0.309 | 2.48 | 188.939 | 0.6807 | 7496 | 0.681 | 0.1588 | 0.0541 | -0.09434 | -0.3444 | 165.49 | 0.743 | 7496 | 0.743 | 0.1486 | 0.002648 | 0.06112 | -0.04 | 3.625 | 0.8474 | 7496 | 0.847 | 0.022 |
| 3 | 1 | 0.17552 | 2.439 | 0.4649 | 0.474 | 0.398 | 0.0741 | Test 2 | 0.08397 | 0.1109 | 0.3738 | 2.48 | 208.301 | 0.7324 | 7496 | 0.732 | 0.1667 | 0.0326 | 0.07602 | 0.3577 | 235.87 | 0.68 | 7496 | 0.68 | 0.1774 | 0.002519 | -0.0624 | 0.035 | 3.661 | 0.8401 | 7496 | 0.84 | 0.0221 |
| 5 | 1 | 0.17552 | 2.439 | 0.4649 | 0.485 | 0.321 | 0.0719 | Test 3 | 0.07024 | -0.4093 | 0.06401 | 2.48 | 229.386 | 0.7373 | 7496 | 0.737 | 0.1749 | -0.035 | -0.2807 | 0.05495 | 347.09 | 0.469 | 7496 | 0.469 | 0.2152 | 0.002294 | -0.0326 | -0.062 | 3.779 | 0.8279 | 7496 | 0.828 | 0.0225 |
| 7 | 1 | 0.17552 | 2.439 | 0.4649 | 0.469 | 0.353 | 0.0701 | Test 4 | 0.04824 | 0.07523 | 0.4135 | 2.48 | 290.993 | 0.6947 | 7496 | 0.695 | 0.197 | -0.026 | 0.03673 | 0.325 | 378.71 | 0.514 | 7496 | 0.514 | 0.2248 | 0.002157 | -0.058 | 0.035 | 3.899 | 0.8161 | 7496 | 0.816 | 0.0228 |
| 9 | 1 | 0.17552 | 2.439 | 0.4649 | 0.406 | 0.345 | 0.0681 | Test 5 | 0.00803 | 0.3108 | 0.2484 | 2.48 | 403.568 | 0.5953 | 7496 | 0.595 | 0.232 | -0.043 | 0.2193 | 0.2084 | 390.44 | 0.468 | 7496 | 0.468 | 0.2282 | -0.00207 | -0.0203 | 0.063 | 4.017 | 0.803 | 7496 | 0.803 | 0.0231 |
| 11 | 1 | 0.17552 | 2.439 | 0.4649 | 0.393 | 0.337 | 0.0663 | Test 6 | -0.02322 | 0.0319 | -0.3687 | 2.48 | 601.416 | 0.5257 | 9736 | 0.526 | 0.2485 | -0.061 | 0.02984 | -0.2741 | 522.45 | 0.415 | 9736 | 0.415 | 0.2317 | 0.002031 | 0.06206 | -0.017 | 5.331 | 0.7906 | 9736 | 0.791 | 0.0234 |
| 13 | 1 | 0.17552 | 2.439 | 0.4649 | 0.387 | 0.324 | 0.0643 | Test 7 | -0.05792 | -0.2899 | 0.155 | 2.48 | 512.888 | 0.4413 | 7496 | 0.441 | 0.2616 | -0.075 | -0.2245 | 0.1099 | 412.2 | 0.362 | 7496 | 0.362 | 0.2345 | 0.002011 | -0.0475 | -0.04 | 4.084 | 0.7809 | 7496 | 0.781 | 0.0233 |
| 15 | 1 | 0.17552 | 2.439 | 0.4649 | 0.385 | 0.310 | 0.0623 | Test 8 | -0.09146 | 0.08779 | 0.2799 | 2.48 | 539.46 | 0.3744 | 7496 | 0.374 | 0.2683 | -0.084 | 0.06505 | 0.2157 | 398.46 | 0.323 | 7496 | 0.323 | 0.2306 | 0.002244 | -0.045 | 0.04 | 4.055 | 0.7692 | 7496 | 0.769 | 0.0233 |
| 17 | 1 | 0.17552 | 2.439 | 0.4649 | 0.373 | 0.275 | 0.0605 | Test 9 | -0.1198 | -0.0644 | -0.245 | 2.48 | 562.74 | 0.2996 | 7496 | 0.299 | 0.274 | -0.099 | -0.06374 | -0.1647 | 377.48 | 0.237 | 7496 | 0.236 | 0.2244 | -0.00232 | 0.04067 | -0.042 | 4.031 | 0.7591 | 7496 | 0.759 | 0.0232 |
| 17 | 3 | 0.17552 | 2.439 | 0.4649 | 0.356 | 0.301 | 0.0603 | Test 10 | -0.05479 | 0.2842 | -0.0984 | 2.48 | 392.243 | 0.4638 | 7496 | 0.464 | 0.2288 | -0.073 | 0.2194 | -0.0623 | 370.55 | 0.345 | 7496 | 0.345 | 0.2223 | -0.00222 | 0.04411 | 0.038 | 4.079 | 0.7562 | 7496 | 0.756 | 0.0233 |
| 15 | 3 | 0.17552 | 2.439 | 0.4649 | 0.375 | 0.308 | 0.0619 | Test 11 | -0.02528 | -0.3491 | -0.02602 | 2.48 | 355.704 | 0.5637 | 7496 | 0.564 | 0.2178 | -0.062 | -0.245 | -0.0234 | 353.58 | 0.391 | 7496 | 0.391 | 0.2172 | 0.002456 | -0.0245 | -0.054 | 4.457 | 0.7485 | 7496 | 0.748 | 0.0244 |
| 7 | 3 | 0.17552 | 2.439 | 0.4649 | 0.407 | 0.324 | 0.0702 | Test 12 | 0.02857 | -0.3783 | -0.0119 | 2.48 | 324.629 | 0.6234 | 7496 | 0.623 | 0.2081 | 0.0017 | -0.3214 | -0.0228 | 303.25 | 0.562 | 7496 | 0.562 | 0.2011 | 0.002688 | -0.0312 | -0.06 | 4.064 | 0.808 | 7496 | 0.808 | 0.0233 |
| 1 | 3 | 0.17552 | 2.439 | 0.4649 | 0.368 | 0.359 | 0.0769 | Test 13 | 0.0528 | 0.2098 | 0.235 | 2.48 | 308.902 | 0.5465 | 7496 | 0.546 | 0.203 | 0.0305 | 0.1749 | 0.2782 | 249.89 | 0.619 | 7496 | 0.618 | 0.1826 | 0.003494 | -0.0299 | 0.067 | 3.605 | 0.8487 | 7496 | 0.849 | 0.0219 |
| 1 | 5 | 0.17552 | 2.439 | 0.4649 | 0.317 | 0.270 | 0.077 | Test 14 | 0.00784 | -0.2448 | -0.1886 | 2.48 | 379.933 | 0.4852 | 7496 | 0.485 | 0.2251 | -0.022 | -0.1885 | -0.1603 | 414.12 | 0.357 | 7496 | 0.356 | 0.235 | 0.003424 | 0.01794 | -0.071 | 3.594 | 0.8495 | 7496 | 0.849 | 0.0219 |
| 7 | 5 | 0.17552 | 2.439 | 0.4649 | 0.405 | 0.327 | 0.0702 | Test 15 | 0.02707 | -0.3513 | 0.14 | 2.48 | 285.445 | 0.6527 | 7496 | 0.653 | 0.1951 | 0.0006 | -0.3057 | 0.1154 | 281.65 | 0.587 | 7496 | 0.587 | 0.1938 | 0.002677 | -0.0535 | -0.041 | 4.064 | 0.8081 | 7496 | 0.808 | 0.0233 |
| 15 | 5 | 0.17552 | 2.439 | 0.4649 | 0.371 | 0.320 | 0.0626 | Test 16 | -0.01229 | 0.2247 | 0.279 | 2.48 | 360.796 | 0.5715 | 7496 | 0.571 | 0.2194 | -0.055 | 0.1578 | 0.2129 | 347.04 | 0.432 | 7496 | 0.431 | 0.2152 | 0.002639 | -0.0192 | 0.057 | 4.254 | 0.7601 | 7496 | 0.76 | 0.0238 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R007 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.19340 | 1.769 | 0.4852 | 0.535 | 0.366 | 0.0636 | Test 1 | 0.1006 | 0.3601 | -0.2427 | 3.51 | 164.721 | 0.811 | 7496 | 0.811 | 0.1482 | 0.0093 | 0.3185 | -0.1612 | 370.5 | 0.563 | 7496 | 0.563 | 0.2223 | 0.005734 | 0.05378 | 0.021 | 2.188 | 0.8515 | 7496 | 0.851 | 0.0171 |
| 3 | 1 | 0.19340 | 1.769 | 0.4852 | 0.558 | 0.382 | 0.0614 | Test 2 | 0.07822 | 0.357 | -0.3209 | 3.51 | 144.827 | 0.8565 | 7496 | 0.856 | 0.139 | -0.012 | 0.3061 | -0.2072 | 386.82 | 0.57 | 7496 | 0.57 | 0.2272 | 0.005701 | 0.05525 | 0.007 | 2.325 | 0.8335 | 7496 | 0.833 | 0.0176 |
| 5 | 1 | 0.19340 | 1.769 | 0.4852 | 0.565 | 0.430 | 0.0586 | Test 3 | 0.05693 | -0.4303 | -0.2699 | 3.51 | 158.346 | 0.8594 | 7496 | 0.859 | 0.1453 | -0.034 | -0.3027 | -0.2558 | 380.85 | 0.607 | 7496 | 0.607 | 0.2254 | -0.00597 | -0.0153 | -0.05 | 2.179 | 0.8269 | 7496 | 0.827 | 0.017 |
| 7 | 1 | 0.19340 | 1.769 | 0.4852 | 0.548 | 0.460 | 0.056 | Test 4 | 0.0389 | 0.4231 | 0.2839 | 3.51 | 197.798 | 0.831 | 7496 | 0.831 | 0.1624 | -0.039 | 0.3199 | 0.2747 | 347.33 | 0.657 | 7496 | 0.657 | 0.2153 | -0.00657 | 0.0161 | 0.047 | 1.925 | 0.8262 | 7496 | 0.826 | 0.016 |
| 9 | 1 | 0.19340 | 1.769 | 0.4852 | 0.527 | 0.477 | 0.0533 | Test 5 | 0.01467 | -0.507 | 0.07515 | 3.51 | 234.763 | 0.8076 | 7496 | 0.808 | 0.177 | -0.029 | -0.4475 | 0.0177 | 303.18 | 0.713 | 7496 | 0.713 | 0.2011 | 0.007061 | -0.0416 | -0.02 | 1.665 | 0.828 | 7496 | 0.828 | 0.0149 |
| 11 | 1 | 0.19340 | 1.769 | 0.4852 | 0.524 | 0.472 | 0.0509 | Test 6 | 0.00768 | -0.4122 | 0.3104 | 3.51 | 244.811 | 0.8031 | 7496 | 0.803 | 0.1807 | -0.033 | -0.363 | 0.2472 | 317.54 | 0.695 | 7496 | 0.695 | 0.2058 | 0.007474 | -0.0416 | 0.013 | 1.439 | 0.8313 | 7496 | 0.831 | 0.0139 |
| 13 | 1 | 0.19340 | 1.769 | 0.4852 | 0.525 | 0.450 | 0.0489 | Test 7 | 0.00754 | -0.4822 | 0.1866 | 3.51 | 230.417 | 0.813 | 7496 | 0.813 | 0.1753 | -0.043 | -0.3808 | 0.1428 | 354.6 | 0.636 | 7496 | 0.636 | 0.2175 | 0.007924 | -0.041 | 8E-04 | 1.209 | 0.8387 | 7496 | 0.839 | 0.0127 |
| 15 | 1 | 0.19340 | 1.769 | 0.4852 | 0.530 | 0.423 | 0.0467 | Test 8 | -0.01267 | 0.5174 | 0.00602 | 3.51 | 183.632 | 0.8455 | 7496 | 0.845 | 0.1565 | -0.063 | 0.3599 | 0.01275 | 380.44 | 0.561 | 7496 | 0.561 | 0.2253 | 0.008115 | 0.03758 | 0.009 | 1.007 | 0.8473 | 7496 | 0.847 | 0.0116 |
| 17 | 1 | 0.19340 | 1.769 | 0.4852 | 0.505 | 0.377 | 0.0453 | Test 9 | -0.03576 | -0.4505 | -0.1325 | 3.51 | 245.675 | 0.7709 | 7496 | 0.771 | 0.181 | -0.098 | -0.2632 | -0.0906 | 405.8 | 0.417 | 7496 | 0.417 | 0.2327 | -0.00824 | -0.0342 | -0.014 | 0.862 | 0.8567 | 7496 | 0.857 | 0.0107 |
| 17 | 3 | 0.19340 | 1.769 | 0.4852 | 0.499 | 0.454 | 0.0452 | Test 10 | 0.00799 | -0.423 | 0.2503 | 3.51 | 69.9553 | 0.9283 | 7496 | 0.928 | 0.0966 | -0.019 | -0.373 | 0.2237 | 170.64 | 0.806 | 7496 | 0.806 | 0.1509 | -0.00823 | -0.0339 | 0.015 | 0.856 | 0.8572 | 7496 | 0.857 | 0.0107 |
| 15 | 3 | 0.19340 | 1.769 | 0.4852 | 0.513 | 0.462 | 0.0468 | Test 11 | 0.00504 | 0.5079 | 0.00959 | 3.51 | 77.0547 | 0.9262 | 7496 | 0.926 | 0.1014 | -0.022 | 0.4404 | 0.00496 | 182.6 | 0.799 | 7496 | 0.799 | 0.1561 | 0.008218 | 0.03816 | 0.006 | 1.008 | 0.8469 | 7496 | 0.847 | 0.0116 |
| 7 | 3 | 0.19340 | 1.769 | 0.4852 | 0.508 | 0.471 | 0.0562 | Test 12 | 0.01842 | -0.4329 | -0.228 | 3.51 | 138.973 | 0.866 | 7496 | 0.866 | 0.1362 | 0.0031 | -0.4167 | -0.2133 | 160.1 | 0.837 | 7496 | 0.837 | 0.1461 | 0.006632 | -0.0287 | -0.04 | 1.928 | 0.8269 | 7496 | 0.827 | 0.016 |
| 1 | 3 | 0.19340 | 1.769 | 0.4852 | 0.407 | 0.373 | 0.0648 | Test 13 | 0.04426 | -0.1999 | -0.3029 | 3.51 | 442.527 | 0.5275 | 7496 | 0.527 | 0.243 | 0.0072 | -0.1261 | -0.3429 | 380.58 | 0.568 | 7496 | 0.568 | 0.2253 | 0.006606 | 0.01347 | -0.057 | 2.013 | 0.8634 | 7496 | 0.863 | 0.0164 |
| 1 | 5 | 0.19340 | 1.769 | 0.4852 | 0.348 | 0.333 | 0.0649 | Test 14 | 0.00989 | 0.2421 | 0.2364 | 3.51 | 496.905 | 0.4635 | 7496 | 0.463 | 0.2575 | 0.0026 | 0.2627 | 0.2009 | 562.34 | 0.422 | 7496 | 0.422 | 0.2739 | 0.006628 | 0.00892 | 0.058 | 2.057 | 0.8608 | 7496 | 0.861 | 0.0166 |
| 7 | 5 | 0.19340 | 1.769 | 0.4852 | 0.509 | 0.497 | 0.0563 | Test 15 | 0.02266 | -0.1975 | -0.4447 | 3.51 | 100.88 | 0.8979 | 7496 | 0.898 | 0.116 | 0.0062 | -0.1878 | -0.4538 | 89.122 | 0.91 | 7496 | 0.91 | 0.109 | 0.006751 | 0.00326 | -0.049 | 1.899 | 0.8291 | 7496 | 0.829 | 0.0159 |
| 15 | 5 | 0.19340 | 1.769 | 0.4852 | 0.495 | 0.479 | 0.047 | Test 16 | 0.00832 | -0.4779 | 0.0927 | 3.51 | 226.843 | 0.7967 | 7496 | 0.797 | 0.174 | -0.01 | -0.464 | 0.07166 | 117.76 | 0.875 | 7496 | 0.875 | 0.1253 | -0.00831 | -0.0386 | 0.002 | 0.972 | 0.8523 | 7496 | 0.852 | 0.0114 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R008 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse | a0 | a1 | b1 | sse | rsq | dfe | adj | rmse |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.09859 | 1.769 | 0.3097 | 0.342 | 0.364 | 0.1369 | Test 1 | 0.0566 | 0.1326 | 0.2532 | 3.51 | 84.71 | 0.7834 | 7496 | 0.783 | 0.1063 | 0.0469 | 0.1151 | 0.2958 | 57.614 | 0.868 | 7496 | 0.868 | 0.0877 | -0.09892 | -0.0169 | 0.034 | 0.722 | 0.8824 | 7496 | 0.882 | 0.0098 |
| 3 | 1 | 0.09859 | 1.769 | 0.3097 | 0.353 | 0.394 | 0.1347 | Test 2 | 0.03683 | 0.291 | -0.1248 | 3.51 | 77.3785 | 0.8293 | 7496 | 0.829 | 0.1016 | 0.0502 | 0.3147 | -0.1373 | 55.03 | 0.889 | 7496 | 0.889 | 0.0857 | -0.09883 | 0.03211 | 0.016 | 0.773 | 0.8617 | 7496 | 0.862 | 0.0102 |
| 5 | 1 | 0.09859 | 1.769 | 0.3097 | 0.370 | 0.395 | 0.1327 | Test 3 | 0.02758 | 0.3331 | -0.07822 | 3.51 | 72.8748 | 0.8576 | 7496 | 0.858 | 0.0986 | 0.0402 | 0.3391 | -0.1054 | 63.282 | 0.882 | 7496 | 0.882 | 0.0919 | -0.09893 | 0.03023 | 0.015 | 0.766 | 0.8483 | 7496 | 0.848 | 0.0101 |
| 7 | 1 | 0.09859 | 1.769 | 0.3097 | 0.379 | 0.384 | 0.1308 | Test 4 | 0.02599 | -0.3141 | -0.1622 | 3.51 | 96.6293 | 0.829 | 7496 | 0.829 | 0.1135 | 0.0248 | -0.3347 | -0.1295 | 63.299 | 0.884 | 7496 | 0.884 | 0.0919 | -0.09911 | -0.0107 | -0.03 | 0.757 | 0.8328 | 7496 | 0.833 | 0.01 |
| 9 | 1 | 0.09859 | 1.769 | 0.3097 | 0.387 | 0.362 | 0.1291 | Test 5 | 0.02481 | -0.3255 | 0.1591 | 3.51 | 83.4625 | 0.855 | 7496 | 0.855 | 0.1055 | 0.0099 | -0.2977 | 0.1873 | 76.414 | 0.859 | 7496 | 0.859 | 0.101 | -0.09906 | -0.0289 | 0.008 | 0.799 | 0.8086 | 7496 | 0.809 | 0.0103 |
| 11 | 1 | 0.09859 | 1.769 | 0.3097 | 0.397 | 0.347 | 0.1274 | Test 6 | 0.02907 | 0.1503 | -0.3362 | 3.51 | 53.0889 | 0.9055 | 7496 | 0.906 | 0.0842 | -0.001 | 0.1275 | -0.3214 | 63.006 | 0.877 | 7496 | 0.877 | 0.0917 | -0.09878 | 0.02435 | -0.015 | 0.896 | 0.7744 | 7496 | 0.774 | 0.0109 |
| 13 | 1 | 0.09859 | 1.769 | 0.3097 | 0.392 | 0.346 | 0.126 | Test 7 | 0.02833 | 0.04349 | 0.3613 | 3.51 | 40.9942 | 0.9238 | 7496 | 0.924 | 0.074 | 0.0005 | 0.06167 | 0.3404 | 51.308 | 0.897 | 7496 | 0.897 | 0.0827 | -0.09879 | -0.0101 | 0.025 | 0.914 | 0.7518 | 7496 | 0.752 | 0.011 |
| 15 | 1 | 0.09859 | 1.769 | 0.3097 | 0.383 | 0.341 | 0.1246 | Test 8 | 0.02545 | 0.3568 | -0.02015 | 3.51 | 33.576 | 0.9345 | 7496 | 0.935 | 0.0669 | -0.002 | 0.3386 | -0.0106 | 34.806 | 0.925 | 7496 | 0.925 | 0.0681 | -0.09871 | 0.02237 | 0.013 | 0.947 | 0.7257 | 7496 | 0.726 | 0.0112 |
| 17 | 1 | 0.09859 | 1.769 | 0.3097 | 0.358 | 0.334 | 0.1232 | Test 9 | 0.01708 | -0.1223 | 0.3182 | 3.51 | 29.0968 | 0.9374 | 7496 | 0.937 | 0.0623 | -0.006 | -0.1173 | 0.3061 | 30.132 | 0.931 | 7496 | 0.93 | 0.0634 | -0.09865 | -0.0174 | 0.017 | 0.958 | 0.7018 | 7496 | 0.702 | 0.0113 |
| 17 | 3 | 0.09859 | 1.769 | 0.3097 | 0.344 | 0.337 | 0.1232 | Test 10 | 0.01603 | -0.3083 | 0.111 | 3.51 | 51.4906 | 0.8866 | 7496 | 0.887 | 0.0829 | -0.011 | -0.3113 | 0.0986 | 42.161 | 0.905 | 7496 | 0.905 | 0.075 | -0.09864 | -0.0243 | -0.003 | 0.958 | 0.7024 | 7496 | 0.702 | 0.0113 |
| 15 | 3 | 0.09859 | 1.769 | 0.3097 | 0.348 | 0.341 | 0.1246 | Test 11 | -0.02506 | -0.2753 | -0.1684 | 3.51 | 364.333 | 0.5173 | 7496 | 0.517 | 0.2205 | 0.0069 | -0.2803 | -0.1821 | 26.323 | 0.941 | 7496 | 0.941 | 0.0593 | -0.09874 | -0.0115 | -0.023 | 0.942 | 0.7273 | 7496 | 0.727 | 0.0112 |
| 7 | 3 | 0.09859 | 1.769 | 0.3097 | 0.317 | 0.338 | 0.1311 | Test 12 | 0.00127 | -0.2974 | -0.1048 | 3.51 | 164.116 | 0.6943 | 7496 | 0.694 | 0.148 | 0.0078 | -0.3192 | -0.0858 | 31.594 | 0.928 | 7496 | 0.928 | 0.0649 | -0.09898 | -0.019 | -0.026 | 0.797 | 0.8291 | 7496 | 0.829 | 0.0103 |
| 1 | 3 | 0.09859 | 1.769 | 0.3097 | 0.299 | 0.349 | 0.1368 | Test 13 | 0.00341 | -0.2804 | -0.09337 | 3.51 | 91.7521 | 0.7812 | 7496 | 0.781 | 0.1106 | 0.0356 | -0.2891 | -0.1206 | 44.853 | 0.891 | 7496 | 0.891 | 0.0774 | -0.09885 | -0.0151 | -0.035 | 0.75 | 0.878 | 7496 | 0.878 | 0.01 |
| 1 | 5 | 0.09859 | 1.769 | 0.3097 | 0.315 | 0.287 | 0.1368 | Test 14 | -0.02183 | -0.2298 | -0.1818 | 3.51 | 259.765 | 0.5536 | 7496 | 0.553 | 0.1862 | 0.0021 | -0.2 | -0.2022 | 209.29 | 0.592 | 7496 | 0.592 | 0.1671 | -0.09881 | 0.00163 | -0.038 | 0.748 | 0.8785 | 7496 | 0.879 | 0.01 |
| 7 | 5 | 0.09859 | 1.769 | 0.3097 | 0.301 | 0.335 | 0.1312 | Test 15 | 0.00837 | 0.2553 | -0.1435 | 3.51 | 236.062 | 0.5768 | 7496 | 0.577 | 0.1775 | -0.011 | 0.2843 | -0.1567 | 71.421 | 0.847 | 7496 | 0.847 | 0.0976 | -0.09894 | 0.03201 | 0.004 | 0.791 | 0.8318 | 7496 | 0.832 | 0.0103 |
| 15 | 5 | 0.09859 | 1.769 | 0.3097 | 0.308 | 0.352 | 0.1245 | Test 16 | 0.01945 | -0.2507 | 0.1431 | 3.51 | 442.08 | 0.4141 | 7496 | 0.414 | 0.2428 | -0.018 | -0.3005 | 0.145 | 58.549 | 0.877 | 7496 | 0.877 | 0.0884 | -0.09872 | -0.0257 | 0.003 | 0.932 | 0.7283 | 7496 | 0.728 | 0.0111 |

| Location | Loading Parameters | | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R009** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** |
| 1 | 1 | 0.09799 | 1.217 | 0.2777 | 0.253 | 0.255 | 0.1223 | Test 1 | 0.00467 | 0.2145 | -0.1255 | 4.96 | 237.991 | 0.4932 | 7496 | 0.493 | 0.1782 | 0.0283 | 0.1805 | -0.1379 | 44.793 | 0.812 | 7496 | 0.812 | 0.0773 | -0.0994 | 0.02056 | -0.01 | 0.149 | 0.9297 | 7496 | 0.93 | 0.0045 |
| 3 | 1 | 0.09799 | 1.217 | 0.2777 | 0.244 | 0.268 | 0.1212 | Test 2 | 0.00496 | -0.1339 | -0.1985 | 4.97 | 157.054 | 0.5778 | 7496 | 0.578 | 0.1447 | 0.0227 | -0.1519 | -0.1926 | 38.384 | 0.855 | 7496 | 0.855 | 0.0716 | -0.0995 | -0.0109 | -0.019 | 0.03 | 0.9835 | 7496 | 0.984 | 0.002 |
| 5 | 1 | 0.09799 | 1.217 | 0.2777 | 0.253 | 0.268 | 0.1204 | Test 3 | 0.00441 | -0.142 | -0.2045 | 4.97 | 105.504 | 0.6878 | 7496 | 0.688 | 0.1186 | 0.0139 | -0.1544 | -0.2024 | 40.614 | 0.857 | 7496 | 0.857 | 0.0736 | -0.09948 | -0.0135 | -0.016 | 0.009 | 0.9943 | 7496 | 0.994 | 0.0011 |
| 7 | 1 | 0.09799 | 1.217 | 0.2777 | 0.282 | 0.262 | 0.1204 | Test 4 | 0.08923 | -0.1228 | 0.1482 | 4.96 | 393.744 | 0.2608 | 7496 | 0.261 | 0.2292 | 0.0069 | -0.1954 | 0.1647 | 40.277 | 0.859 | 7496 | 0.859 | 0.0733 | -0.09929 | -0.0137 | 0.016 | 0.022 | 0.9872 | 7496 | 0.987 | 0.0017 |
| 9 | 1 | 0.09799 | 1.217 | 0.2777 | 0.268 | 0.255 | 0.1209 | Test 5 | 0.00716 | -0.2612 | -0.00626 | 4.97 | 32.2298 | 0.8881 | 7496 | 0.888 | 0.0656 | 0.0013 | -0.2511 | -0.0337 | 7.732 | 0.969 | 7496 | 0.969 | 0.0321 | -0.09909 | -0.0209 | 0.006 | 0.048 | 0.9739 | 7496 | 0.974 | 0.0025 |
| 11 | 1 | 0.09799 | 1.217 | 0.2777 | 0.260 | 0.250 | 0.1221 | Test 6 | 0.00803 | 0.1152 | 0.2242 | 4.97 | 15.81 | 0.9378 | 7496 | 0.938 | 0.0459 | 0.002 | 0.08609 | 0.2321 | 6.0184 | 0.975 | 7496 | 0.975 | 0.0283 | -0.09874 | 0.01787 | 0.015 | 0.095 | 0.9557 | 7496 | 0.956 | 0.0036 |
| 13 | 1 | 0.09799 | 1.217 | 0.2777 | 0.251 | 0.245 | 0.1235 | Test 7 | 0.00941 | 0.2268 | -0.08441 | 4.97 | 7.8696 | 0.9654 | 7496 | 0.965 | 0.0324 | 0.0059 | 0.2272 | -0.0748 | 7.8451 | 0.965 | 7496 | 0.965 | 0.0324 | -0.09834 | 0.0162 | -0.019 | 0.143 | 0.9434 | 7496 | 0.943 | 0.0044 |
| 15 | 1 | 0.09799 | 1.217 | 0.2777 | 0.247 | 0.236 | 0.1251 | Test 8 | 0.01094 | -0.2241 | 0.0746 | 4.96 | 8.7412 | 0.9599 | 7496 | 0.96 | 0.0341 | 0.0045 | -0.224 | 0.05817 | 4.8798 | 0.976 | 7496 | 0.976 | 0.0255 | -0.09846 | -0.0162 | 0.021 | 0.247 | 0.9149 | 7496 | 0.915 | 0.0057 |
| 17 | 1 | 0.09799 | 1.217 | 0.2777 | 0.234 | 0.227 | 0.1269 | Test 9 | 0.0089 | 0.2246 | 0.00621 | 4.97 | 4.5543 | 0.9765 | 7496 | 0.977 | 0.0246 | 0.0025 | 0.2244 | 0.00325 | 5.0181 | 0.974 | 7496 | 0.974 | 0.0259 | -0.09803 | 0.02189 | -0.019 | 0.226 | 0.9329 | 7496 | 0.933 | 0.0055 |
| 17 | 3 | 0.09799 | 1.217 | 0.2777 | 0.246 | 0.232 | 0.1271 | Test 10 | 0.01811 | 0.09556 | -0.2065 | 4.97 | 6.004 | 0.97 | 7496 | 0.97 | 0.0283 | 0.0028 | 0.1019 | -0.2048 | 5.6427 | 0.972 | 7496 | 0.972 | 0.0274 | -0.09805 | -0.0101 | -0.027 | 0.204 | 0.9393 | 7496 | 0.939 | 0.0052 |
| 15 | 3 | 0.09799 | 1.217 | 0.2777 | 0.244 | 0.243 | 0.1257 | Test 11 | 0.0068 | 0.00426 | 0.2373 | 4.97 | 84.8714 | 0.7134 | 7496 | 0.713 | 0.1064 | 0.0042 | -0.01546 | 0.2382 | 8.6379 | 0.961 | 7496 | 0.961 | 0.0339 | -0.09844 | 0.01434 | 0.023 | 0.169 | 0.9429 | 7496 | 0.943 | 0.0048 |
| 7 | 3 | 0.09799 | 1.217 | 0.2777 | 0.222 | 0.260 | 0.1208 | Test 12 | -0.1211 | 0.09984 | 0.01296 | 4.97 | 326.249 | 0.1043 | 7496 | 0.104 | 0.2086 | 0.0022 | 0.2418 | -0.0892 | 11.653 | 0.955 | 7496 | 0.955 | 0.0394 | -0.09977 | 0.01746 | -0.012 | 0.018 | 0.9894 | 7496 | 0.989 | 0.0015 |
| 1 | 3 | 0.09799 | 1.217 | 0.2777 | 0.267 | 0.251 | 0.1231 | Test 13 | -0.02739 | -0.0268 | 0.2378 | 4.97 | 19.4824 | 0.9168 | 7496 | 0.917 | 0.051 | 0.0062 | -0.02918 | 0.2435 | 7.4787 | 0.968 | 7496 | 0.968 | 0.0316 | -0.09992 | 0.00739 | 0.022 | 0.087 | 0.9585 | 7496 | 0.959 | 0.0034 |
| 1 | 5 | 0.09799 | 1.217 | 0.2777 | 0.265 | 0.264 | 0.123 | Test 14 | -0.01457 | 0.25 | 0.00161 | 4.97 | 10.2826 | 0.958 | 7496 | 0.958 | 0.037 | 0.0031 | 0.2607 | 0.01434 | 16.96 | 0.938 | 7496 | 0.938 | 0.0476 | -0.09989 | 0.02255 | 0.005 | 0.087 | 0.9583 | 7496 | 0.958 | 0.0034 |
| 7 | 5 | 0.09799 | 1.217 | 0.2777 | 0.275 | 0.279 | 0.1208 | Test 15 | 0.00213 | -0.1575 | -0.2226 | 4.97 | 95.1932 | 0.7454 | 7496 | 0.745 | 0.1127 | -0.012 | -0.157 | -0.2155 | 9.4368 | 0.966 | 7496 | 0.966 | 0.0355 | -0.09976 | -0.016 | -0.014 | 0.019 | 0.9885 | 7496 | 0.989 | 0.0016 |
| 15 | 5 | 0.09799 | 1.217 | 0.2777 | 0.262 | 0.257 | 0.1258 | Test 16 | 0.02398 | 0.09121 | 0.2202 | 4.96 | 117.523 | 0.6444 | 7496 | 0.644 | 0.1252 | -0.01 | 0.05654 | 0.2402 | 4.8784 | 0.979 | 7496 | 0.979 | 0.0255 | -0.09843 | 0.02212 | 0.016 | 0.182 | 0.9388 | 7496 | 0.939 | 0.0049 |
| | | 0.09799 | 1.217 | 0.2777 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R0010** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** |
| 1 | 1 | 0.15 | 2.197 | 0.2145 | 0.494 | 0.306 | 0.1582 | Test 1 | 0.102 | 0.3077 | 0.2423 | 3.31 | 237.94 | 0.7074 | 7496 | 0.707 | 0.1782 | 0.0045 | 0.208 | 0.2182 | 314.52 | 0.52 | 7496 | 0.52 | 0.2048 | -0.1021 | -0.0174 | 0.053 | 3.265 | 0.7833 | 7496 | 0.783 | 0.0209 |
| 3 | 1 | 0.15 | 2.197 | 0.2145 | 0.487 | 0.327 | 0.155 | Test 2 | 0.0704 | 0.215 | -0.3574 | 3.31 | 272.181 | 0.7056 | 7496 | 0.706 | 0.1906 | -0.02 | 0.1866 | -0.2436 | 323.25 | 0.522 | 7496 | 0.522 | 0.2077 | -0.1017 | 0.05327 | 5E-04 | 3.209 | 0.7683 | 7496 | 0.768 | 0.0207 |
| 5 | 1 | 0.15 | 2.197 | 0.2145 | 0.472 | 0.370 | 0.1522 | Test 3 | 0.04375 | -0.4214 | -0.07642 | 3.31 | 291.725 | 0.7021 | 7496 | 0.702 | 0.1973 | -0.04 | -0.3173 | -0.0899 | 323.34 | 0.558 | 7496 | 0.558 | 0.2077 | -0.1014 | -0.0202 | -0.047 | 3.275 | 0.747 | 7496 | 0.747 | 0.0209 |
| 7 | 1 | 0.15 | 2.197 | 0.2145 | 0.453 | 0.401 | 0.1497 | Test 4 | 0.01678 | 0.2981 | -0.3184 | 3.31 | 299.91 | 0.7041 | 7496 | 0.704 | 0.2 | -0.05 | 0.2592 | -0.2356 | 308.41 | 0.599 | 7496 | 0.599 | 0.2028 | -0.1012 | 0.04798 | 0.007 | 3.375 | 0.7231 | 7496 | 0.723 | 0.0212 |
| 9 | 1 | 0.15 | 2.197 | 0.2145 | 0.436 | 0.425 | 0.1475 | Test 5 | -0.01041 | 0.05004 | -0.4227 | 3.31 | 331.098 | 0.6724 | 7496 | 0.672 | 0.2102 | -0.061 | 0.08993 | -0.352 | 314.03 | 0.612 | 7496 | 0.612 | 0.2047 | -0.1014 | 0.03881 | -0.025 | 3.41 | 0.7003 | 7496 | 0.7 | 0.0213 |
| 11 | 1 | 0.15 | 2.197 | 0.2145 | 0.455 | 0.436 | 0.145 | Test 6 | -0.0354 | -0.1169 | 0.4028 | 3.31 | 343.154 | 0.6578 | 7496 | 0.658 | 0.214 | -0.073 | -0.1338 | 0.3376 | 335.07 | 0.596 | 7496 | 0.596 | 0.2114 | -0.1016 | -0.0384 | 0.02 | 3.465 | 0.671 | 7496 | 0.671 | 0.0215 |
| 13 | 1 | 0.15 | 2.197 | 0.2145 | 0.461 | 0.429 | 0.1429 | Test 7 | -0.06723 | 0.3908 | 0.05027 | 3.31 | 373.495 | 0.6092 | 7496 | 0.609 | 0.2232 | -0.087 | 0.3362 | 0.06328 | 358.23 | 0.551 | 7496 | 0.55 | 0.2186 | -0.1017 | 0.03025 | 0.028 | 3.523 | 0.6443 | 7496 | 0.644 | 0.0217 |
| 15 | 1 | 0.15 | 2.197 | 0.2145 | 0.450 | 0.415 | 0.1406 | Test 8 | -0.09829 | 0.321 | -0.1443 | 3.31 | 416.124 | 0.5274 | 7496 | 0.527 | 0.2356 | -0.096 | 0.29 | -0.1321 | 364.46 | 0.511 | 7496 | 0.511 | | -0.1016 | 0.03861 | 0.006 | 3.675 | 0.6087 | 7496 | 0.609 | 0.0221 |
| 17 | 1 | 0.15 | 2.197 | 0.2145 | 0.432 | 0.403 | 0.1389 | Test 9 | -0.1353 | 0.1267 | -0.268 | 3.31 | 445.995 | 0.425 | 7496 | 0.425 | 0.2439 | -0.099 | 0.09785 | -0.2877 | 348.8 | 0.498 | 7496 | 0.498 | 0.2157 | -0.1014 | 0.02729 | -0.026 | 3.821 | 0.5797 | 7496 | 0.58 | 0.0226 |
| 17 | 3 | 0.15 | 2.197 | 0.2145 | 0.435 | 0.436 | 0.1388 | Test 10 | -0.05061 | -0.3649 | -0.1211 | 3.31 | 235.462 | 0.7019 | 7496 | 0.702 | 0.1772 | -0.055 | -0.3577 | -0.1323 | 238.75 | 0.696 | 7496 | 0.695 | 0.1785 | -0.1014 | -0.0239 | -0.029 | 3.815 | 0.5792 | 7496 | 0.579 | 0.0226 |
| 15 | 3 | 0.15 | 2.197 | 0.2145 | 0.448 | 0.457 | 0.1407 | Test 11 | -0.03101 | -0.275 | 0.3139 | 3.31 | 213.768 | 0.7534 | 7496 | 0.753 | 0.1689 | -0.047 | -0.2773 | 0.3019 | 200.84 | 0.758 | 7496 | 0.758 | 0.1637 | -0.1017 | -0.0382 | 0.008 | 3.652 | 0.6095 | 7496 | 0.609 | 0.0221 |
| 7 | 3 | 0.15 | 2.197 | 0.2145 | 0.432 | 0.424 | 0.1496 | Test 12 | 0.01478 | 0.2392 | 0.3415 | 3.31 | 269.508 | 0.7075 | 7496 | 0.707 | 0.1896 | -0.026 | 0.2137 | 0.335 | 264.88 | 0.691 | 7496 | 0.691 | 0.188 | -0.1013 | 0.00657 | 0.048 | 3.351 | 0.7228 | 7496 | 0.723 | 0.0211 |
| 1 | 3 | 0.15 | 2.197 | 0.2145 | 0.359 | 0.310 | 0.1581 | Test 13 | 0.04525 | -0.0322 | 0.312 | 3.31 | 443.682 | 0.454 | 7496 | 0.454 | 0.2433 | -0.022 | -0.06321 | 0.281 | 390.02 | 0.444 | 7496 | 0.444 | 0.2281 | -0.1023 | -0.0498 | 0.025 | 3.199 | 0.7849 | 7496 | 0.785 | 0.0207 |
| 1 | 5 | 0.15 | 2.197 | 0.2145 | 0.322 | 0.225 | 0.1586 | Test 14 | -0.01246 | -0.2902 | 0.108 | 3.31 | 487.926 | 0.4242 | 7496 | 0.424 | 0.2551 | 0.0015 | -0.2037 | 0.09226 | 737.58 | 0.203 | 7496 | 0.202 | 0.3137 | -0.1024 | -0.0467 | -0.031 | 3.198 | 0.7873 | 7496 | 0.787 | 0.0207 |
| 7 | 5 | 0.15 | 2.197 | 0.2145 | 0.443 | 0.439 | 0.1499 | Test 15 | 0.01601 | 0.3876 | 0.179 | 3.31 | 240.413 | 0.7398 | 7496 | 0.74 | 0.1791 | -0.04 | 0.3616 | 0.1697 | 294.46 | 0.67 | 7496 | 0.67 | 0.1982 | -0.1014 | 0.0212 | 0.044 | 3.339 | 0.7255 | 7496 | 0.725 | 0.0211 |
| 15 | 5 | 0.15 | 2.197 | 0.2145 | 0.439 | 0.456 | 0.1407 | Test 16 | -0.01841 | -0.3847 | -0.1699 | 3.31 | 249.67 | 0.7265 | 7496 | 0.726 | 0.1825 | -0.036 | -0.3868 | -0.1647 | 207.93 | 0.761 | 7496 | 0.761 | 0.1665 | -0.1017 | -0.0203 | -0.033 | 3.648 | 0.6098 | 7496 | 0.61 | 0.0221 |
| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R0011** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** |
| 1 | 1 | 0.15261 | 1.898 | 0.484 | 0.492 | 0.300 | 0.1585 | Test 1 | 0.1017 | -0.2153 | 0.3257 | 3.31 | 322.96 | 0.6949 | 9640 | 0.695 | 0.183 | 0.0039 | -0.1927 | 0.2253 | 419.78 | 0.503 | 9640 | 0.502 | 0.2087 | -0.1024 | -0.0547 | -0.013 | 4.131 | 0.7862 | 9640 | 0.786 | 0.0207 |
| 3 | 1 | 0.15261 | 1.898 | 0.484 | 0.488 | 0.324 | 0.1552 | Test 2 | 0.07329 | -0.3982 | 0.1162 | 3.31 | 288.47 | 0.691 | 7496 | 0.691 | 0.1962 | -0.025 | -0.2971 | 0.036 | 324.45 | 0.509 | 7496 | 0.508 | 0.208 | -0.1019 | -0.036 | -0.039 | 3.22 | 0.7676 | 7496 | 0.768 | 0.0207 |
| 5 | 1 | 0.15261 | 1.898 | 0.484 | 0.478 | 0.367 | 0.1523 | Test 3 | 0.04116 | -0.2421 | -0.3641 | 3.31 | 287.809 | 0.7136 | 7496 | 0.713 | 0.1959 | -0.046 | -0.1331 | -0.2924 | 327.48 | 0.542 | 7496 | 0.541 | 0.209 | -0.1015 | 0.01814 | -0.047 | 3.29 | 0.746 | 7496 | 0.746 | 0.0209 |
| 7 | 1 | 0.15261 | 1.898 | 0.484 | 0.454 | 0.404 | 0.1498 | Test 4 | 0.01675 | 0.4262 | 0.09703 | 3.31 | 297.788 | 0.7064 | 7496 | 0.706 | 0.1993 | -0.056 | 0.3308 | 0.1097 | 321.67 | 0.586 | 7496 | 0.586 | 0.2072 | -0.1014 | 0.01739 | 0.045 | 3.383 | 0.7218 | 7496 | 0.722 | 0.0212 |
| 9 | 1 | 0.15261 | 1.898 | 0.484 | 0.447 | 0.423 | 0.1474 | Test 5 | -0.01404 | -0.2127 | 0.3776 | 3.31 | 326.518 | 0.6832 | 7496 | 0.683 | 0.2087 | -0.07 | -0.2075 | 0.2859 | 323.2 | 0.592 | 7496 | 0.591 | 0.2076 | -0.1016 | -0.0452 | 0.008 | 3.436 | 0.6964 | 7496 | 0.696 | 0.0214 |
| 11 | 1 | 0.15261 | 1.898 | 0.484 | 0.463 | 0.432 | 0.1453 | Test 6 | -0.04549 | 0.1011 | -0.4055 | 3.31 | 356.275 | 0.6477 | 7496 | 0.648 | 0.218 | -0.08 | 0.1207 | -0.3302 | 339.19 | 0.577 | 7496 | 0.577 | 0.2127 | -0.1018 | 0.03695 | -0.023 | 3.468 | 0.6722 | 7496 | 0.672 | 0.0215 |
| 13 | 1 | 0.15261 | 1.898 | 0.484 | 0.466 | 0.431 | 0.1429 | Test 7 | -0.06607 | -0.0941 | -0.3887 | 3.31 | 377.727 | 0.6136 | 7496 | 0.614 | 0.2245 | -0.094 | -0.05834 | -0.3321 | 364.7 | 0.539 | 7496 | 0.539 | 0.2206 | -0.1019 | 0.01798 | -0.037 | 3.544 | 0.6399 | 7496 | 0.64 | 0.0217 |
| 15 | 1 | 0.15261 | 1.898 | 0.484 | 0.459 | 0.416 | 0.1411 | Test 8 | -0.0878 | -0.0944 | 0.3589 | 3.31 | 412.035 | 0.5562 | 7496 | 0.556 | 0.2345 | -0.107 | -0.1035 | 0.2906 | 387.02 | 0.48 | 7496 | 0.48 | 0.2272 | -0.1019 | -0.0283 | 0.027 | 3.666 | 0.611 | 7496 | 0.611 | 0.0221 |
| 17 | 1 | 0.15261 | 1.898 | 0.484 | 0.435 | 0.399 | 0.1389 | Test 9 | -0.1293 | 0.1353 | -0.2743 | 3.31 | 442.624 | 0.4422 | 7496 | 0.442 | 0.243 | -0.098 | 0.1115 | -0.2792 | 352.68 | 0.49 | 7496 | 0.49 | 0.2169 | -0.1015 | 0.02704 | -0.026 | 3.873 | 0.5754 | 7496 | 0.575 | 0.0227 |
| 17 | 3 | 0.15261 | 1.898 | 0.484 | 0.409 | 0.432 | 0.1388 | Test 10 | -0.06224 | 0.335 | -0.09049 | 3.31 | 298.709 | 0.6019 | 7496 | 0.602 | 0.1996 | -0.061 | 0.36 | -0.0899 | 251.68 | 0.672 | 7496 | 0.672 | 0.1832 | -0.1015 | 0.0354 | 0.012 | 3.883 | 0.5727 | 7496 | 0.573 | 0.0228 |
| 15 | 3 | 0.15261 | 1.898 | 0.484 | 0.453 | 0.457 | 0.141 | Test 11 | -0.02627 | -0.4039 | -0.1389 | 3.31 | 233.991 | 0.7452 | 7496 | 0.745 | 0.1767 | -0.054 | -0.3757 | -0.1457 | 210.72 | 0.743 | 7496 | 0.743 | 0.1677 | -0.1019 | -0.0233 | -0.031 | 3.635 | 0.6119 | 7496 | 0.612 | 0.022 |
| 7 | 3 | 0.15261 | 1.898 | 0.484 | 0.398 | 0.427 | 0.1499 | Test 12 | 0.0042 | 0.2805 | 0.2769 | 3.31 | 396.958 | 0.5948 | 7496 | 0.595 | 0.2301 | -0.029 | 0.2584 | 0.303 | 263.88 | 0.693 | 7496 | 0.693 | 0.1876 | -0.1015 | 0.00059 | 0.048 | 3.377 | 0.722 | 7496 | 0.722 | 0.0212 |
| 1 | 3 | 0.15261 | 1.898 | 0.484 | 0.349 | 0.307 | 0.1586 | Test 13 | 0.04326 | -0.287 | 0.106 | 3.31 | 469.601 | 0.4278 | 7496 | 0.428 | 0.2503 | -0.019 | -0.2797 | 0.06706 | 393.74 | 0.441 | 7496 | 0.44 | 0.2292 | -0.1026 | -0.0465 | -0.031 | 3.167 | 0.7877 | 7496 | 0.788 | 0.0206 |
| 1 | 5 | 0.15261 | 1.898 | 0.484 | 0.323 | 0.247 | 0.1586 | Test 14 | -0.03725 | 0.2043 | 0.1997 | 3.31 | 584.304 | 0.3438 | 7496 | 0.344 | 0.2792 | -0.021 | 0.1581 | 0.1606 | 698.81 | 0.214 | 7496 | 0.214 | 0.3053 | -0.1026 | -0.0112 | 0.055 | 3.187 | 0.7865 | 7496 | 0.786 | 0.0206 |
| 7 | 5 | 0.15261 | 1.898 | 0.484 | 0.424 | 0.431 | 0.1498 | Test 15 | 0.01073 | 0.309 | -0.2745 | 3.31 | 291.634 | 0.6872 | 7496 | 0.687 | 0.1972 | -0.035 | 0.296 | -0.2639 | 316.91 | 0.651 | 7496 | 0.65 | 0.2056 | -0.1015 | 0.04827 | 4E-04 | 3.331 | 0.724 | 7496 | 0.724 | 0.0211 |
| 15 | 5 | 0.15261 | 1.898 | 0.484 | 0.426 | 0.462 | 0.141 | Test 16 | -0.03914 | 0.1394 | 0.3612 | 3.31 | 394.111 | 0.5878 | 7496 | 0.588 | 0.2293 | -0.043 | 0.1432 | 0.3945 | 203.74 | 0.764 | 7496 | 0.764 | 0.1649 | -0.102 | -0.0092 | 0.038 | 3.644 | 0.6107 | 7496 | 0.611 | 0.022 |
| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R0012** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** |
| 1 | 1 | 0.15752 | 1.548 | 0.4828 | 0.489 | 0.348 | 0.1495 | Test 1 | 0.1043 | 0.3186 | -0.216 | 4.05 | 233.151 | 0.7044 | 7496 | 0.704 | 0.1764 | 0.0061 | 0.302 | -0.16 | 364.32 | 0.546 | 7496 | 0.546 | 0.2205 | -0.1026 | 0.04535 | 0.012 | 2.436 | 0.7718 | 7496 | 0.772 | 0.018 |
| 3 | 1 | 0.15752 | 1.548 | 0.4828 | 0.503 | 0.345 | 0.1469 | Test 2 | 0.07365 | 0.3057 | 0.3008 | 4.05 | 226.521 | 0.7528 | 7496 | 0.753 | 0.1738 | -0.039 | 0.2126 | 0.2204 | 411.26 | 0.461 | 7496 | 0.461 | 0.2342 | -0.1021 | 0.00413 | 0.045 | 2.709 | 0.7353 | 7496 | 0.735 | 0.019 |
| 5 | 1 | 0.15752 | 1.548 | 0.4828 | 0.520 | 0.379 | 0.1441 | Test 3 | 0.05386 | 0.4159 | -0.2106 | 4.05 | 193.468 | 0.8081 | 7496 | 0.808 | 0.1607 | -0.056 | 0.2872 | -0.1484 | 381.89 | 0.507 | 7496 | 0.506 | 0.2257 | -0.1019 | 0.04138 | 0.009 | 2.807 | 0.7045 | 7496 | 0.704 | 0.0194 |
| 7 | 1 | 0.15752 | 1.548 | 0.4828 | 0.505 | 0.422 | 0.142 | Test 4 | 0.02771 | 0.2693 | -0.3941 | 4.05 | 227.312 | 0.7899 | 7496 | 0.79 | 0.1741 | -0.063 | 0.2065 | -0.2939 | 344.81 | 0.584 | 7496 | 0.584 | 0.2145 | -0.1023 | 0.03716 | -0.014 | 2.706 | 0.686 | 7496 | 0.686 | 0.019 |
| 9 | 1 | 0.15752 | 1.548 | 0.4828 | 0.494 | 0.449 | 0.1398 | Test 5 | 0.01349 | -0.0119 | -0.4801 | 4.05 | 206.131 | 0.8075 | 7496 | 0.808 | 0.1658 | -0.064 | 0.00617 | -0.3844 | 325.04 | 0.63 | 7496 | 0.63 | 0.2082 | -0.1027 | 0.01477 | -0.034 | 2.454 | 0.6772 | 7496 | 0.677 | 0.0181 |
| 11 | 1 | 0.15752 | 1.548 | 0.4828 | 0.482 | 0.472 | 0.1377 | Test 6 | -0.01009 | -0.4715 | 0.00561 | 4.05 | 233.931 | 0.7809 | 7496 | 0.781 | 0.1767 | -0.058 | -0.4144 | -0.0109 | 278.89 | 0.698 | 7496 | 0.698 | 0.1929 | -0.1031 | -0.0325 | -0.012 | 2.231 | 0.6684 | 7496 | 0.668 | 0.0173 |
| 13 | 1 | 0.15752 | 1.548 | 0.4828 | 0.480 | 0.480 | 0.1359 | Test 7 | -0.01063 | -0.418 | 0.2143 | 4.05 | 219.163 | 0.7906 | 7496 | 0.791 | 0.171 | -0.048 | -0.3893 | 0.1878 | 236.76 | 0.747 | 7496 | 0.747 | 0.1777 | -0.1034 | -0.0314 | 0.008 | 2.023 | 0.6614 | 7496 | 0.661 | 0.0164 |
| 15 | 1 | 0.15752 | 1.548 | 0.4828 | 0.487 | 0.481 | 0.1344 | Test 8 | -0.018 | 0.2698 | 0.3842 | 4.05 | 189.028 | 0.8139 | 7496 | 0.814 | 0.1588 | -0.039 | 0.2582 | 0.3591 | 158.86 | 0.822 | 7496 | 0.822 | 0.1456 | -0.1037 | 0.01635 | 0.026 | 1.793 | 0.6637 | 7496 | 0.664 | 0.0155 |
| 17 | 1 | 0.15752 | 1.548 | 0.4828 | 0.477 | 0.460 | 0.1331 | Test 9 | -0.0207 | -0.4281 | 0.1588 | 4.05 | 151.232 | 0.8379 | 7496 | 0.838 | 0.142 | -0.049 | -0.3932 | 0.1218 | 148.49 | 0.811 | 7496 | 0.811 | 0.1407 | -0.1037 | -0.028 | 0.009 | 1.617 | 0.6679 | 7496 | 0.668 | 0.0147 |

| Location | | Loading Parameters | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | 3 | 0.15752 | 1.548 | 0.4828 | 0.448 | 0.481 | 0.1331 | Test 10 | 0.0004 | 0.4288 | 0.1289 | 4.05 | 121.499 | 0.8609 | 7496 | 0.861 | 0.1273 | -0.043 | 0.4146 | 0.1428 | 86.358 | 0.893 | 7496 | 0.893 | 0.1073 | -0.1037 | 0.02781 | 0.009 | 1.659 | 0.6609 | 7496 | 0.661 | 0.0149 |
| 15 | 3 | 0.15752 | 1.548 | 0.4828 | 0.462 | 0.500 | 0.1343 | Test 11 | 0.00066 | 0.2352 | -0.3973 | 4.05 | 124.134 | 0.8656 | 7496 | 0.866 | 0.1287 | -0.037 | 0.2434 | -0.3933 | 52.655 | 0.938 | 7496 | 0.938 | 0.0838 | -0.1037 | 0.01552 | -0.026 | 1.82 | 0.6588 | 7496 | 0.659 | 0.0156 |
| 7 | 3 | 0.15752 | 1.548 | 0.4828 | 0.470 | 0.476 | 0.142 | Test 12 | 0.02281 | 0.2027 | -0.3981 | 4.05 | 214.105 | 0.7775 | 7496 | 0.777 | 0.169 | -0.035 | 0.2122 | -0.3866 | 167.68 | 0.813 | 7496 | 0.813 | 0.1496 | -0.1023 | 0.0319 | -0.024 | 2.701 | 0.6865 | 7496 | 0.686 | 0.019 |
| 1 | 3 | 0.15752 | 1.548 | 0.4828 | 0.433 | 0.360 | 0.15 | Test 13 | 0.0707 | 0.3424 | -0.1177 | 4.05 | 311.275 | 0.6123 | 7496 | 0.612 | 0.2038 | -0.054 | 0.3045 | -0.0292 | 413.86 | 0.459 | 7496 | 0.459 | 0.235 | -0.1028 | 0.04305 | 0.019 | 2.536 | 0.7672 | 7496 | 0.767 | 0.0184 |
| 1 | 5 | 0.15752 | 1.548 | 0.4828 | 0.400 | 0.372 | 0.1499 | Test 14 | -0.00397 | 0.366 | -0.1503 | 4.05 | 311.243 | 0.6535 | 7496 | 0.653 | 0.2038 | -0.035 | 0.3218 | -0.0979 | 472.05 | 0.473 | 7496 | 0.473 | 0.2509 | -0.1028 | 0.04529 | 0.013 | 2.541 | 0.7661 | 7496 | 0.766 | 0.0184 |
| 7 | 5 | 0.15752 | 1.548 | 0.4828 | 0.430 | 0.518 | 0.1421 | Test 15 | -0.01596 | 0.1373 | 0.3904 | 4.05 | 320.772 | 0.6669 | 7496 | 0.667 | 0.2069 | -0.05 | 0.1266 | 0.451 | 77.143 | 0.914 | 7496 | 0.914 | 0.1014 | -0.1024 | -0.0054 | 0.039 | 2.691 | 0.687 | 7496 | 0.687 | 0.0189 |
| 15 | 5 | 0.15752 | 1.548 | 0.4828 | 0.459 | 0.528 | 0.1343 | Test 16 | 0.00733 | 0.2347 | -0.3857 | 4.05 | 237.503 | 0.7629 | 7496 | 0.763 | 0.178 | -0.064 | 0.2697 | -0.3773 | 52.801 | 0.939 | 7496 | 0.939 | 0.0839 | -0.1037 | 0.01929 | -0.024 | 1.839 | 0.657 | 7496 | 0.657 | 0.0157 |

| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R0015** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.08653 | 1.769 | 0.3797 | 0.372 | 0.344 | 0.0364 | Test 1 | 0.05655 | 0.07112 | 0.3074 | 3.51 | 181.168 | 0.6732 | 7496 | 0.673 | 0.1555 | 0.0526 | 0.08114 | 0.2799 | 184.83 | 0.633 | 7496 | 0.633 | 0.157 | 0.001542 | -0.0183 | 0.03 | 0.778 | 0.8544 | 7496 | 0.854 | 0.0102 |
| 3 | 1 | 0.08653 | 1.769 | 0.3797 | 0.383 | 0.329 | 0.0345 | Test 2 | 0.04899 | 0.1662 | -0.2902 | 3.51 | 254.714 | 0.6222 | 7496 | 0.622 | 0.1843 | 0.0313 | 0.125 | -0.2706 | 203.94 | 0.62 | 7496 | 0.62 | 0.1649 | 0.001312 | 0.03276 | 0.005 | 0.811 | 0.8362 | 7496 | 0.836 | 0.0104 |
| 5 | 1 | 0.08653 | 1.769 | 0.3797 | 0.403 | 0.298 | 0.0326 | Test 3 | 0.04109 | -0.3258 | 0.158 | 3.51 | 207.365 | 0.7032 | 7496 | 0.703 | 0.1663 | 0.0082 | -0.2473 | 0.1507 | 230.3 | 0.577 | 7496 | 0.577 | 0.1753 | 0.001178 | -0.0281 | -0.014 | 0.882 | 0.8074 | 7496 | 0.807 | 0.0108 |
| 7 | 1 | 0.08653 | 1.769 | 0.3797 | 0.412 | 0.337 | 0.0309 | Test 4 | 0.03443 | -0.3745 | 0.04545 | 3.51 | 225.89 | 0.7025 | 7496 | 0.702 | 0.1736 | -0.036 | -0.2952 | 0.05859 | 227.62 | 0.599 | 7496 | 0.599 | 0.1743 | 0.001151 | -0.0222 | -0.02 | 0.961 | 0.7759 | 7496 | 0.776 | 0.0113 |
| 9 | 1 | 0.08653 | 1.769 | 0.3797 | 0.404 | 0.372 | 0.0294 | Test 5 | 0.01843 | -0.2373 | -0.3042 | 3.51 | 165.875 | 0.771 | 7496 | 0.771 | 0.1488 | -0.049 | -0.2035 | -0.2516 | 193.55 | 0.67 | 7496 | 0.67 | 0.1607 | 0.001264 | 0.00026 | -0.028 | 1.081 | 0.7337 | 7496 | 0.734 | 0.012 |
| 11 | 1 | 0.08653 | 1.769 | 0.3797 | 0.403 | 0.389 | 0.0282 | Test 6 | 0.01005 | 0.3785 | -0.1047 | 3.51 | 157.154 | 0.7864 | 7496 | 0.786 | 0.1448 | -0.06 | 0.3154 | -0.0934 | 184.96 | 0.687 | 7496 | 0.687 | 0.1571 | 0.001418 | 0.02524 | 0.009 | 1.196 | 0.6927 | 7496 | 0.693 | 0.0126 |
| 13 | 1 | 0.08653 | 1.769 | 0.3797 | 0.388 | 0.401 | 0.0269 | Test 7 | 0.00054 | 0.3706 | 0.1136 | 3.51 | 143.4 | 0.7971 | 7496 | 0.797 | 0.1383 | -0.058 | 0.324 | 0.1127 | 146.33 | 0.751 | 7496 | 0.751 | 0.1397 | 0.001573 | 0.01551 | 0.02 | 1.314 | 0.6457 | 7496 | 0.646 | 0.0132 |
| 15 | 1 | 0.08653 | 1.769 | 0.3797 | 0.386 | 0.398 | 0.0255 | Test 8 | -0.00638 | 0.117 | -0.3612 | 3.51 | 139.661 | 0.7947 | 7496 | 0.795 | 0.1365 | -0.051 | 0.1184 | -0.326 | 114.41 | 0.798 | 7496 | 0.798 | 0.1235 | 0.001795 | 0.01865 | -0.015 | 1.431 | 0.596 | 7496 | 0.596 | 0.0138 |
| 17 | 1 | 0.08653 | 1.769 | 0.3797 | 0.377 | 0.381 | 0.0242 | Test 9 | -0.0162 | 0.3611 | 0.00596 | 3.51 | 124.369 | 0.7973 | 7496 | 0.797 | 0.1288 | -0.045 | 0.3359 | 0.00859 | 77.106 | 0.846 | 7496 | 0.846 | 0.1014 | 0.002044 | 0.01992 | 0.01 | 1.562 | 0.5413 | 7496 | 0.541 | 0.0144 |
| 17 | 3 | 0.08653 | 1.769 | 0.3797 | 0.344 | 0.321 | 0.0243 | Test 10 | 0.02051 | 0.2783 | 0.1642 | 3.51 | 570.91 | 0.4068 | 7496 | 0.407 | 0.276 | -0.011 | 0.2805 | 0.1318 | 551.11 | 0.395 | 7496 | 0.395 | 0.2711 | 0.002097 | 0.00697 | 0.021 | 1.563 | 0.5414 | 7496 | 0.541 | 0.0144 |
| 17 | 2 | 0.08653 | 1.769 | 0.3797 | 0.372 | 0.393 | 0.0243 | Test 11 | -0.01865 | 0.3348 | -0.1115 | 3.51 | 123.236 | 0.7912 | 7496 | 0.791 | 0.1282 | -0.052 | 0.3264 | -0.1005 | 59.873 | 0.88 | 7496 | 0.88 | 0.0894 | 0.002055 | 0.02192 | 0.003 | 1.551 | 0.5437 | 7496 | 0.544 | 0.0144 |
| 15 | 2 | 0.08653 | 1.769 | 0.3797 | 0.379 | 0.407 | 0.0254 | Test 12 | -0.01462 | 0.2718 | 0.242 | 3.51 | 144.85 | 0.7741 | 7496 | 0.774 | 0.139 | -0.055 | 0.2552 | 0.2423 | 72.773 | 0.865 | 7496 | 0.864 | 0.0985 | 0.001738 | 0.00864 | 0.022 | 1.425 | 0.5959 | 7496 | 0.596 | 0.0138 |
| 7 | 2 | 0.08653 | 1.769 | 0.3797 | 0.391 | 0.340 | 0.031 | Test 13 | 0.03413 | -0.1668 | -0.315 | 3.51 | 472.171 | 0.5022 | 7496 | 0.502 | 0.251 | -0.032 | -0.1501 | -0.2689 | 404.2 | 0.468 | 7496 | 0.468 | 0.2322 | 0.001229 | 0.01262 | -0.027 | 0.965 | 0.7753 | 7496 | 0.775 | 0.0113 |
| 1 | 2 | 0.08653 | 1.769 | 0.3797 | 0.351 | 0.292 | 0.0366 | Test 14 | 0.04218 | -0.0704 | -0.3007 | 3.51 | 484.777 | 0.4245 | 7496 | 0.424 | 0.2543 | 0.0145 | -0.05866 | -0.2714 | 322.77 | 0.473 | 7496 | 0.472 | 0.2075 | 0.001557 | 0.0211 | -0.028 | 0.773 | 0.8561 | 7496 | 0.856 | 0.0102 |
| 1 | 2 | 0.08653 | 1.769 | 0.3797 | 0.358 | 0.307 | 0.0366 | Test 15 | 0.04672 | 0.06047 | 0.3058 | 3.51 | 267.266 | 0.5769 | 7496 | 0.577 | 0.1888 | 0.0282 | 0.06261 | 0.2715 | 217.16 | 0.573 | 7496 | 0.573 | 0.1702 | 0.001573 | -0.0217 | 0.027 | 0.763 | 0.8577 | 7496 | 0.858 | 0.0101 |

| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R0016** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0.08796 | 1.217 | 0.3697 | 0.387 | 0.381 | 0.0287 | Test 1 | 0.04965 | -0.0563 | 0.3324 | 4.96 | 119.769 | 0.7806 | 7496 | 0.781 | 0.1264 | 0.0367 | -0.02228 | 0.3431 | 69.53 | 0.864 | 7496 | 0.864 | 0.0963 | 0.001429 | -0.0197 | 0.019 | 0.528 | 0.8409 | 7496 | 0.841 | 0.0084 |
| 3 | 1 | 0.08796 | 1.217 | 0.3697 | 0.389 | 0.370 | 0.0267 | Test 2 | 0.04557 | 0.2235 | -0.2614 | 4.97 | 183.702 | 0.7072 | 7496 | 0.707 | 0.1565 | 0.0033 | 0.2598 | -0.2581 | 56.559 | 0.899 | 7496 | 0.899 | 0.0869 | 0.001435 | 0.02407 | 0.008 | 0.581 | 0.8046 | 7496 | 0.805 | 0.0088 |
| 5 | 1 | 0.08796 | 1.217 | 0.3697 | 0.387 | 0.410 | 0.0245 | Test 3 | 0.02455 | 0.04746 | -0.3595 | 4.97 | 92.3868 | 0.8422 | 7496 | 0.842 | 0.111 | -0.033 | 0.06604 | -0.3703 | 53.635 | 0.908 | 7496 | 0.908 | 0.0846 | 0.00128 | 0.01379 | -0.019 | 0.636 | 0.7614 | 7496 | 0.761 | 0.0092 |
| 7 | 1 | 0.08796 | 1.217 | 0.3697 | 0.399 | 0.430 | 0.0227 | Test 4 | 0.02621 | -0.3058 | 0.2136 | 4.97 | 241.272 | 0.6838 | 7496 | 0.684 | 0.1794 | -0.051 | -0.3099 | 0.2171 | 55.552 | 0.906 | 7496 | 0.906 | 0.0861 | 0.001128 | -0.0203 | 0.007 | 0.663 | 0.7255 | 7496 | 0.725 | 0.0094 |
| 9 | 1 | 0.08796 | 1.217 | 0.3697 | 0.409 | 0.430 | 0.022 | Test 5 | -0.01155 | 0.3098 | 0.249 | 4.97 | 203.487 | 0.7443 | 7496 | 0.744 | 0.1648 | -0.053 | 0.2478 | 0.2846 | 46.669 | 0.92 | 7496 | 0.92 | 0.0789 | 0.001253 | 0.0108 | 0.018 | 0.697 | 0.6984 | 7496 | 0.698 | 0.0096 |
| 11 | 1 | 0.08796 | 1.217 | 0.3697 | 0.393 | 0.417 | 0.0221 | Test 6 | 0.03045 | 0.3593 | -0.0451 | 4.96 | 172.996 | 0.7397 | 7496 | 0.74 | 0.1519 | -0.046 | 0.3715 | 0.00924 | 41.204 | 0.926 | 7496 | 0.926 | 0.0741 | 0.001224 | 0.02081 | 0.002 | 0.68 | 0.7067 | 7496 | 0.707 | 0.0095 |
| 13 | 1 | 0.08796 | 1.217 | 0.3697 | 0.369 | 0.400 | 0.0227 | Test 7 | 0.0003 | -0.3174 | -0.1879 | 4.97 | 81.6362 | 0.862 | 7496 | 0.862 | 0.1044 | -0.044 | -0.283 | -0.2164 | 28.919 | 0.943 | 7496 | 0.943 | 0.0621 | 0.001855 | -0.0189 | 0.009 | 0.718 | 0.6945 | 7496 | 0.694 | 0.0098 |
| 15 | 1 | 0.08796 | 1.217 | 0.3697 | 0.358 | 0.378 | 0.0219 | Test 8 | 0.00545 | -0.3502 | 0.03805 | 4.97 | 65.7468 | 0.8762 | 7496 | 0.876 | 0.0937 | -0.037 | -0.341 | 0.01424 | 26.446 | 0.943 | 7496 | 0.943 | 0.0594 | 0.001801 | -0.0193 | 0.006 | 0.561 | 0.7303 | 7496 | 0.73 | 0.0086 |
| 17 | 1 | 0.08796 | 1.217 | 0.3697 | 0.333 | 0.357 | 0.0216 | Test 9 | 0.00565 | 0.3183 | -0.07794 | 4.97 | 48.7542 | 0.892 | 7496 | 0.892 | 0.0806 | -0.034 | 0.3173 | -0.065 | 41.324 | 0.905 | 7496 | 0.905 | 0.0742 | 0.001859 | 0.01553 | -0.012 | 0.407 | 0.7814 | 7496 | 0.781 | 0.0074 |

| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R0017** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rmse** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | 1 | 0.15303 | 2.120 | 0.6782 | 0.347 | 0.283 | 0.0199 | Test 1 | -0.1864 | -0.0774 | -0.1411 | 5.72 | 546.33 | 0.1509 | 7496 | 0.151 | 0.27 | -0.169 | -0.05649 | -0.0993 | 562.76 | 0.08 | 7496 | 0.08 | 0.274 | 0.002848 | -0.0169 | 0.002 | 7.511 | 0.1266 | 7496 | 0.126 | 0.0317 |
| 15 | 1 | 0.15303 | 2.120 | 0.6782 | 0.346 | 0.318 | 0.0171 | Test 2 | -0.1644 | 0.1448 | 0.1094 | 5.72 | 504.716 | 0.1966 | 7496 | 0.196 | 0.2595 | -0.179 | 0.06378 | 0.1231 | 460.52 | 0.135 | 7496 | 0.135 | 0.2479 | 0.002071 | 0.01397 | 0.006 | 7.811 | 0.0978 | 7496 | 0.098 | 0.0323 |

Geometric Re-Adjustment Factor for x to transpose
lab book result to distance from toe 10.5 cm

| Location | Loading Parameters | | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R030** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rmse** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rms** | | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rms** |
| -0.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.275 | 0.238 | 0.071 | Test 20 | 0.03775 | -0.1496 | 0.1847 | 3.51 | 60.75 | 0.777 | 7496 | 0.7772 | 0.09 | 0.04542 | -0.1247 | 0.1461 | 29.34 | 0.825 | 7496 | 0.825 | 0.0626 | | 0.0311 | -0.04 | 0.003 | 0.198 | 0.968 | 7496 | 0.968 | 0.005 |
| 3.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.291 | 0.275 | 0.070 | Test 1 | 0.02801 | -0.0919 | 0.2459 | 3.51 | 25.82 | 0.909 | 7496 | 0.9091 | 0.0587 | 0.02984 | -0.1056 | 0.2211 | 12.35 | 0.948 | 7496 | 0.948 | 0.0406 | | 0.033 | -0.034 | 0.0141 | 0.1913 | 0.964 | 7496 | 0.964 | 0.005 |
| 5.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.305 | 0.294 | 0.069 | Test 2 | 0.02466 | 0.2465 | -0.1343 | 3.51 | 31.94 | 0.902 | 7496 | 0.9024 | 0.0653 | 0.03473 | 0.2337 | -0.1118 | 13.09 | 0.951 | 7496 | 0.951 | 0.0418 | | 0.034 | 0.0338 | 0.0104 | 0.1898 | 0.961 | 7496 | 0.961 | 0.005 |
| 7.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.328 | 0.321 | 0.068 | Test 3 | 0.02752 | -0.2831 | 0.1004 | 3.51 | 29.3 | 0.92 | 7496 | 0.9202 | 0.0625 | 0.04082 | -0.2612 | 0.102 | 10.47 | 0.966 | 7496 | 0.966 | 0.0374 | | 0.0341 | -0.032 | -0.01 | 0.1858 | 0.958 | 7496 | 0.958 | 0.005 |
| 9.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.331 | 0.340 | 0.066 | Test 4 | 0.0219 | 0.3029 | -0.0618 | 3.51 | 19.62 | 0.948 | 7496 | 0.9481 | 0.0512 | 0.04195 | 0.2871 | -0.0811 | 9.319 | 0.973 | 7496 | 0.973 | 0.0353 | | 0.0342 | 0.0293 | 0.0127 | 0.19 | 0.953 | 7496 | 0.953 | 0.005 |
| 11.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.336 | 0.349 | 0.065 | Test 5 | 0.01993 | 0.09909 | -0.3002 | 3.51 | 16.57 | 0.958 | 7496 | 0.9576 | 0.047 | 0.03735 | 0.08407 | -0.3002 | 10.61 | 0.972 | 7496 | 0.972 | 0.0376 | | 0.0343 | 0.0239 | -0.019 | 0.1869 | 0.949 | 7496 | 0.949 | 0.005 |
| 13.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.338 | 0.345 | 0.063 | Test 6 | 0.01764 | 0.1247 | 0.2952 | 3.51 | 13.22 | 0.967 | 7496 | 0.9668 | 0.042 | 0.02804 | 0.1436 | 0.2824 | 12.15 | 0.969 | 7496 | 0.969 | 0.0403 | | 0.0343 | 0.0031 | 0.0288 | 0.1746 | 0.948 | 7496 | 0.948 | 0.00 |
| 15.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.328 | 0.327 | 0.062 | Test 7 | 0.0144 | 0.247 | -0.194 | 3.51 | 11.99 | 0.969 | 7496 | 0.9686 | 0.04 | 0.0169 | 0.2389 | -0.1978 | 13.21 | 0.965 | 7496 | 0.965 | 0.042 | | 0.0344 | 0.0267 | -0.007 | 0.1585 | 0.947 | 7496 | 0.947 | 0.00 |
| 17.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.319 | 0.307 | 0.061 | Test 8 | 0.00914 | -0.0562 | -0.3045 | 3.51 | 9.516 | 0.974 | 7496 | 0.9742 | 0.0356 | 0.008925 | -0.05977 | -0.2924 | 10.96 | 0.968 | 7496 | 0.968 | 0.0382 | | 0.0345 | 0.0064 | -0.025 | 0.1357 | 0.95 | 7496 | 0.949 | 0.00 |
| 19.5 | 1 | 0.09916 | 1.796 | 0.249711 | 0.304 | 0.266 | 0.059 | Test 9 | 0.00491 | 0.283 | 0.0965 | 3.51 | 10.88 | 0.969 | 7496 | 0.9686 | 0.0381 | -0.01566 | 0.239 | 0.0732 | 119.8 | 0.662 | 7496 | 0.662 | 0.1264 | | 0.0346 | 0.0204 | 0.0141 | 0.115 | 0.953 | 7496 | 0.953 | 0.00 |
| 19.5 | 3 | 0.09916 | 1.796 | 0.249711 | 0.304 | 0.305 | 0.059 | Test 10 | 0.00504 | -0.2031 | -0.2194 | 3.51 | 9.526 | 0.972 | 7496 | 0.9724 | 0.0356 | 0.01766 | -0.1998 | -0.2065 | 12.59 | 0.961 | 7496 | 0.961 | 0.041 | | 0.0347 | 0.0088 | -0.023 | 0.113 | 0.953 | 7496 | 0.953 | 0.00 |
| 17.5 | 3 | 0.09916 | 1.796 | 0.249711 | 0.316 | 0.312 | 0.061 | Test 11 | 0.00846 | 0.2956 | 0.08484 | 3.51 | 9.045 | 0.975 | 7496 | 0.9751 | 0.0347 | 0.01752 | 0.2849 | 0.0733 | 11.46 | 0.966 | 7496 | 0.966 | 0.0391 | | 0.0347 | 0.0198 | 0.0171 | 0.1366 | 0.95 | 7496 | 0.95 | 0.00 |
| 11.5 | 3 | 0.09916 | 1.796 | 0.249711 | 0.317 | 0.324 | 0.065 | Test 12 | 0.01248 | 0.236 | 0.1924 | 3.51 | 8.757 | 0.975 | 7496 | 0.9754 | 0.0342 | 0.02929 | 0.2359 | 0.1764 | 6.8 | 0.98 | 7496 | 0.98 | 0.0301 | | 0.0347 | 0.0082 | 0.0295 | 0.1887 | 0.949 | 7496 | 0.949 | 0.005 |
| 9.5 | 3 | 0.09916 | 1.796 | 0.249711 | 0.313 | 0.315 | 0.067 | Test 13 | 0.01625 | 0.0569 | 0.2912 | 3.51 | 10.15 | 0.97 | 7496 | 0.9702 | 0.0368 | 0.03126 | 0.06867 | 0.2749 | 11.53 | 0.963 | 7496 | 0.963 | 0.0392 | | 0.0347 | -0.014 | 0.029 | 0.1935 | 0.952 | 7496 | 0.952 | 0.005 |
| 5.5 | 3 | 0.09916 | 1.796 | 0.249711 | 0.300 | 0.276 | 0.067 | Test 22 | 0.01904 | 0.2525 | 0.1234 | 3.51 | 9.236 | 0.97 | 7496 | 0.9698 | 0.0351 | 0.02122 | 0.2285 | 0.1138 | 6.29 | 0.975 | 7496 | 0.975 | 0.029 | | 0.0317 | 0.0132 | 0.0325 | 0.1915 | 0.96 | 7496 | 0.96 | 0.005 |
| 3.5 | 3 | 0.09916 | 1.796 | 0.249711 | 0.277 | 0.260 | 0.072 | Test 14 | 0.00864 | -0.1941 | 0.1851 | 3.51 | 14.17 | 0.95 | 7496 | 0.95 | 0.0435 | 0.0153 | -0.1812 | 0.164 | 18.08 | 0.925 | 7496 | 0.925 | 0.0491 | | 0.0347 | -0.037 | 0.0018 | 0.2217 | 0.959 | 7496 | 0.959 | 0.005 |
| -0.5 | 3 | 0.09916 | 1.796 | 0.249711 | 0.261 | 0.231 | 0.071 | Test 21 | 0.02077 | 0.1574 | 0.1821 | 3.51 | 29.36 | 0.881 | 7496 | 0.881 | 0.0626 | 0.00666 | 0.1396 | 0.176 | 17.43 | 0.916 | 7496 | 0.916 | 0.0482 | | 0.0311 | 0.0047 | 0.0396 | 0.2118 | 0.966 | 7496 | 0.966 | 0.005 |
| -0.5 | 5 | 0.09916 | 1.796 | 0.249711 | 0.249 | 0.210 | 0.071 | Test 24 | 0.00089 | 0.00589 | -0.2483 | 3.51 | 21.87 | 0.914 | 7496 | 0.9136 | 0.054 | -0.04196 | 0.005225 | -0.1677 | 192.6 | 0.354 | 7496 | 0.354 | 0.1603 | | 0.0312 | 0.0274 | -0.029 | 0.2106 | 0.966 | 7496 | 0.966 | 0.005 |
| 3.5 | 5 | 0.09916 | 1.796 | 0.249711 | 0.276 | 0.261 | 0.072 | Test 15 | 0.00738 | 0.08478 | -0.2544 | 3.51 | 10.79 | 0.962 | 7496 | 0.9615 | 0.0379 | 0.01332 | 0.07176 | -0.2367 | 34.01 | 0.871 | 7496 | 0.871 | 0.0674 | | 0.0348 | 0.0332 | -0.017 | 0.2225 | 0.959 | 7496 | 0.959 | 0.005 |
| 5.5 | 5 | 0.09916 | 1.796 | 0.249711 | 0.285 | 0.281 | 0.067 | Test 23 | 0.00526 | 0.00736 | 0.2797 | 3.51 | 6.658 | 0.978 | 7496 | 0.9778 | 0.0298 | 0.02163 | 0.01596 | 0.2589 | 4.643 | 0.982 | 7496 | 0.982 | 0.0249 | | 0.0317 | -0.023 | 0.0267 | 0.1905 | 0.96 | 7496 | 0.96 | 0.005 |
| 9.5 | 5 | 0.09916 | 1.796 | 0.249711 | 0.337 | 0.314 | 0.067 | Test 16 | -0.08213 | 0.2538 | 0.0175 | 3.51 | 384.3 | 0.387 | 7496 | 0.3867 | 0.2264 | 0.02988 | 0.2771 | 0.0606 | 9.822 | 0.969 | 7496 | 0.969 | 0.0362 | | 0.0349 | 0.0221 | 0.0234 | 0.1948 | 0.952 | 7496 | 0.952 | 0.005 |
| 11.5 | 5 | 0.09916 | 1.796 | 0.249711 | 0.324 | 0.314 | 0.066 | Test 17 | 0.02252 | -0.0597 | 0.2952 | 3.51 | 220.2 | 0.607 | 7496 | 0.6068 | 0.1714 | 0.01026 | -0.05586 | 0.2981 | 72.67 | 0.826 | 7496 | 0.826 | 0.0985 | | 0.0351 | -0.023 | 0.0208 | 0.1904 | 0.949 | 7496 | 0.949 | 0.005 |
| 17.5 | 5 | 0.09916 | 1.796 | 0.249711 | 0.307 | 0.321 | 0.061 | Test 18 | 0.00373 | -0.2795 | -0.1168 | 3.51 | 15.55 | 0.957 | 7496 | 0.9567 | 0.0455 | 0.02427 | -0.278 | -0.1044 | 12.37 | 0.964 | 7496 | 0.964 | 0.0406 | | 0.0351 | -0.02 | -0.017 | 0.1355 | 0.95 | 7496 | 0.95 | 0.00 |
| 19.5 | 5 | 0.09916 | 1.796 | 0.249711 | 0.300 | 0.315 | 0.060 | Test 19 | 0.00174 | -0.2754 | 0.1134 | 3.51 | 31.51 | 0.914 | 7496 | 0.9135 | 0.0648 | 0.02355 | -0.2681 | 0.1144 | 17.66 | 0.948 | 7496 | 0.948 | 0.0485 | | 0.0352 | -0.025 | 0.0002 | 0.1143 | 0.953 | 7496 | 0.953 | 0.00 |
| | | | | | | | | | | | | | | | | | | | | | | | | | 0.05022 | 0.0394 | 0.0681 | | | | | | | |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R031 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.211 | 0.182 | 0.057 | Test 20 | 0.02733 | -0.1602 | 0.09001 | 4.97 | 19.58 | 0.866 | 7496 | 0.866 | 0.0511 | 0.02592 | -0.1215 | 0.0978 | 17.82 | 0.837 | 7496 | 0.836 | 0.0488 | | 0.0306 | -0.025 | 0.0067 | 0.0922 | 0.965 | 7496 | 0.965 | 0.00 |
| 3.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.207 | 0.188 | 0.058 | Test 1 | 0.02137 | -0.1591 | 0.09506 | 4.96 | 14.24 | 0.9 | 7496 | 0.9004 | 0.0436 | 0.01478 | -0.1395 | 0.1033 | 16.4 | 0.873 | 7496 | 0.873 | 0.0468 | | 0.034 | -0.02 | 0.0122 | 0.0362 | 0.983 | 7496 | 0.983 | 0.00 |
| 5.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.226 | 0.203 | 0.059 | Test 2 | 0.02541 | 0.0855 | -0.1815 | 4.96 | 6.037 | 0.962 | 7496 | 0.9615 | 0.0284 | 0.01646 | 0.06799 | -0.1739 | 5.22 | 0.962 | 7496 | 0.962 | 0.0264 | | 0.0353 | 0.0106 | -0.021 | 0.0314 | 0.985 | 7496 | 0.985 | 0.00 |
| 7.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.221 | 0.212 | 0.060 | Test 3 | 0.01898 | 0.1819 | -0.087 | 4.97 | 6.657 | 0.958 | 7496 | 0.9582 | 0.0298 | 0.01683 | 0.1645 | -0.1041 | 5.726 | 0.961 | 7496 | 0.961 | 0.0276 | | 0.0358 | 0.0183 | -0.015 | 0.0451 | 0.979 | 7496 | 0.979 | 0.00 |
| 9.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.218 | 0.219 | 0.061 | Test 4 | 0.01686 | -0.1414 | 0.1424 | 4.97 | 6.218 | 0.961 | 7496 | 0.9605 | 0.0288 | 0.01845 | -0.137 | 0.1469 | 6.429 | 0.959 | 7496 | 0.959 | 0.0293 | | 0.036 | 0.0084 | 0.0231 | 0.064 | 0.973 | 7496 | 0.973 | 0.00 |
| 11.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.213 | 0.226 | 0.062 | Test 5 | 0.01396 | 0.1987 | 0.00967 | 4.97 | 4.522 | 0.97 | 7496 | 0.9704 | 0.0246 | 0.01992 | 0.2054 | -0.0175 | 9.989 | 0.941 | 7496 | 0.941 | 0.0365 | | 0.0363 | 0.0224 | -0.013 | 0.0864 | 0.966 | 7496 | 0.966 | 0.00 |
| 13.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.212 | 0.226 | 0.064 | Test 6 | 0.01303 | 0.04143 | 0.1943 | 4.97 | 3.144 | 0.979 | 7496 | 0.9792 | 0.0205 | 0.01769 | 0.04143 | 0.2042 | 3.028 | 0.982 | 7496 | 0.982 | 0.0201 | | 0.0367 | 0.0192 | 0.0188 | 0.1128 | 0.96 | 7496 | 0.96 | 0.00 |
| 15.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.203 | 0.218 | 0.065 | Test 7 | 0.01294 | 0.1593 | -0.1044 | 4.97 | 4.079 | 0.971 | 7496 | 0.9709 | 0.0233 | 0.01541 | 0.1646 | -0.1179 | 5.858 | 0.963 | 7496 | 0.963 | 0.028 | | 0.037 | 0.0117 | -0.026 | 0.1304 | 0.958 | 7496 | 0.958 | 0.00 |
| 17.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.197 | 0.206 | 0.067 | Test 8 | 0.01287 | 0.1839 | 0.00776 | 4.97 | 2.226 | 0.983 | 7496 | 0.9828 | 0.0172 | 0.01364 | 0.1919 | 0.0077 | 4.486 | 0.969 | 7496 | 0.969 | 0.0245 | | 0.0374 | 0.0229 | -0.019 | 0.14 | 0.959 | 7496 | 0.959 | 0.00 |
| 19.5 | 1 | 0.10228 | 1.217 | 0.213728 | 0.184 | 0.189 | 0.069 | Test 9 | 0.012 | 0.1638 | -0.0512 | 4.97 | 2.471 | 0.978 | 7496 | 0.9781 | 0.0182 | 0.01145 | 0.168 | -0.0564 | 12.02 | 0.907 | 7496 | 0.907 | 0.04 | | 0.0376 | 0.0188 | -0.025 | 0.1365 | 0.964 | 7496 | 0.964 | 0.00 |
| 19.5 | 3 | 0.10228 | 1.217 | 0.213728 | 0.189 | 0.201 | 0.069 | Test 10 | 0.01242 | -0.0314 | 0.1741 | 4.97 | 2.812 | 0.977 | 7496 | 0.9766 | 0.0194 | 0.01437 | -0.02386 | 0.1854 | 13 | 0.91 | 7496 | 0.91 | 0.0416 | | 0.0378 | 0.0113 | 0.029 | 0.1385 | 0.963 | 7496 | 0.963 | 0.00 |
| 17.5 | 3 | 0.10228 | 1.217 | 0.213728 | 0.206 | 0.213 | 0.063 | Test 11 | 0.01344 | -0.1885 | -0.0409 | 4.96 | 2.147 | 0.985 | 7496 | 0.9848 | 0.0169 | 0.01405 | -0.1967 | -0.033 | 3.62 | 0.976 | 7496 | 0.976 | 0.022 | | 0.0337 | -0.028 | 0.0106 | 0.1359 | 0.96 | 7496 | 0.96 | 0.00 |
| 11.5 | 3 | 0.10228 | 1.217 | 0.213728 | 0.224 | 0.228 | 0.059 | Test 12 | 0.01315 | -0.072 | 0.198 | 4.97 | 2.203 | 0.987 | 7496 | 0.9869 | 0.0171 | 0.01636 | -0.06032 | 0.2032 | 2.909 | 0.983 | 7496 | 0.983 | 0.0197 | | 0.033 | 0.0004 | 0.0256 | 0.0831 | 0.967 | 7496 | 0.967 | 0.00 |
| 9.5 | 3 | 0.10228 | 1.217 | 0.213728 | 0.221 | 0.223 | 0.057 | Test 13 | 0.01319 | -0.2036 | -0.0419 | 4.97 | 3.323 | 0.98 | 7496 | 0.9799 | 0.0211 | 0.01473 | -0.2054 | -0.0314 | 4.812 | 0.971 | 7496 | 0.971 | 0.0253 | | 0.0328 | -0.024 | 0.0025 | 0.0697 | 0.97 | 7496 | 0.97 | 0.00 |
| 5.5 | 3 | 0.10228 | 1.217 | 0.213728 | 0.218 | 0.211 | 0.055 | Test 22 | 0.01334 | -0.1736 | 0.1083 | 4.97 | 3.661 | 0.977 | 7496 | 0.9772 | 0.0221 | 0.00919 | -0.1621 | 0.1196 | 3.864 | 0.975 | 7496 | 0.975 | 0.0227 | | 0.0316 | -0.02 | 0.0131 | 0.0277 | 0.987 | 7496 | 0.987 | 0.00 |
| 3.5 | 3 | 0.10228 | 1.217 | 0.213728 | 0.207 | 0.194 | 0.056 | Test 14 | 0.01219 | -0.0632 | 0.1841 | 4.97 | 5.117 | 0.965 | 7496 | 0.9652 | 0.0261 | 0.00614 | -0.06068 | 0.1783 | 8.97 | 0.937 | 7496 | 0.937 | 0.0346 | | 0.0322 | 0.0069 | 0.0229 | 0.0368 | 0.983 | 7496 | 0.983 | 0.00 |
| -0.5 | 3 | 0.10228 | 1.217 | 0.213728 | 0.205 | 0.195 | 0.057 | Test 21 | 0.01102 | -0.1696 | -0.0931 | 4.97 | 9.809 | 0.935 | 7496 | 0.9346 | 0.0362 | 0.006855 | -0.1654 | -0.089 | 11.23 | 0.922 | 7496 | 0.922 | 0.0387 | | 0.0307 | -0.019 | -0.018 | 0.0923 | 0.965 | 7496 | 0.965 | 0.00 |
| -0.5 | 5 | 0.10228 | 1.217 | 0.213728 | 0.203 | 0.179 | 0.057 | Test 24 | 0.00179 | 0.1445 | -0.1397 | 4.97 | 15.75 | 0.906 | 7496 | 0.9058 | 0.0458 | -0.1194 | 0.04034 | -0.044 | 235.9 | 0.054 | 7496 | 0.053 | 0.1774 | | 0.0308 | 0.0228 | -0.013 | 0.077 | 0.971 | 7496 | 0.971 | 0.00 |
| 3.5 | 5 | 0.10228 | 1.217 | 0.213728 | 0.220 | 0.207 | 0.056 | Test 15 | 0.00943 | -0.0321 | -0.2079 | 4.97 | 3.809 | 0.978 | 7496 | 0.9775 | 0.0225 | 0.004602 | -0.04056 | -0.1986 | 5.454 | 0.966 | 7496 | 0.966 | 0.027 | | 0.0322 | 0.0034 | -0.024 | 0.036 | 0.984 | 7496 | 0.984 | 0.00 |
| 5.5 | 5 | 0.10228 | 1.217 | 0.213728 | 0.220 | 0.219 | 0.056 | Test 23 | 0.00806 | 0.04069 | -0.2084 | 4.97 | 5.266 | 0.97 | 7496 | 0.9698 | 0.0265 | 0.007546 | 0.02555 | -0.2096 | 5.081 | 0.971 | 7496 | 0.971 | 0.026 | | 0.0317 | 0.0039 | -0.024 | 0.0263 | 0.988 | 7496 | 0.988 | 0.00 |
| 9.5 | 5 | 0.10228 | 1.217 | 0.213728 | 0.246 | 0.226 | 0.057 | Test 16 | 0.03183 | 0.1826 | -0.1119 | 4.97 | 79.53 | 0.684 | 7496 | 0.6837 | 0.103 | 0.01202 | 0.1959 | -0.0868 | 4.008 | 0.977 | 7496 | 0.977 | 0.0231 | | 0.0327 | 0.0169 | -0.018 | 0.069 | 0.97 | 7496 | 0.97 | 0.00 |
| 11.5 | 5 | 0.10228 | 1.217 | 0.213728 | 0.197 | 0.205 | 0.058 | Test 17 | 0.00848 | 0.05406 | -0.181 | 4.97 | 78.14 | 0.631 | 7496 | 0.6311 | 0.1021 | 0.00488 | 0.07408 | -0.1859 | 33.19 | 0.819 | 7496 | 0.819 | 0.0665 | | 0.0329 | 0.0002 | -0.026 | 0.1002 | 0.961 | 7496 | 0.961 | 0.00 |
| 17.5 | 5 | 0.10228 | 1.217 | 0.213728 | 0.205 | 0.215 | 0.063 | Test 18 | 0.00919 | 0.03709 | -0.1918 | 4.97 | 5.26 | 0.965 | 7496 | 0.9645 | 0.0265 | 0.01144 | 0.04018 | -0.1994 | 3.806 | 0.976 | 7496 | 0.976 | 0.0225 | | 0.0337 | -0.014 | -0.026 | 0.1515 | 0.956 | 7496 | 0.956 | 0.00 |
| 19.5 | 5 | 0.10228 | 1.217 | 0.213728 | 0.202 | 0.209 | 0.065 | Test 19 | 0.00885 | 0.00392 | -0.1928 | 4.97 | 2.733 | 0.981 | 7496 | 0.9808 | 0.0191 | 0.01114 | -0.01665 | -0.1968 | 1.91 | 0.987 | 7496 | 0.987 | 0.016 | | 0.0339 | -0.021 | -0.023 | 0.1569 | 0.959 | 7496 | 0.959 | 0.00 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R032 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.242 | 0.119 | 0.101 | Test 21 | 0.00163 | 0.2369 | -0.0389 | 2.86 | 430.7 | 0.334 | 7496 | 0.3339 | 0.2397 | 0.01841 | 0.07474 | 0.0669 | 866.9 | 0.042 | 7496 | 0.041 | 0.3401 | | 0.0286 | 0.0308 | 0.0656 | 1.9528 | 0.91 | 7496 | 0.91 | 0.016 |
| 3.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.364 | 0.448 | 0.098 | Test 1 | 0.01037 | -0.3535 | 0.01299 | 2.86 | 249.7 | 0.653 | 7496 | 0.6526 | 0.1825 | 0.06477 | -0.3664 | -0.1116 | 80.07 | 0.873 | 7496 | 0.873 | 0.1034 | | 0.029 | -0.016 | -0.067 | 2.2247 | 0.889 | 7496 | 0.889 | 0.017 |
| 5.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.391 | 0.488 | 0.096 | Test 2 | -0.01769 | -0.3721 | -0.0234 | 2.86 | 287 | 0.645 | 7496 | 0.6448 | 0.1957 | 0.06762 | -0.4036 | -0.1158 | 81.44 | 0.89 | 7496 | 0.89 | 0.1042 | | 0.0296 | -0.024 | -0.061 | 2.1649 | 0.883 | 7496 | 0.883 | 0.017 |
| 7.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.420 | 0.508 | 0.093 | Test 3 | -0.05493 | -0.2131 | 0.2963 | 2.86 | 383.7 | 0.566 | 7496 | 0.5655 | 0.2262 | 0.06282 | -0.3347 | 0.2936 | 86.91 | 0.895 | 7496 | 0.895 | 0.1077 | | 0.0299 | -0.061 | -0.018 | 2.1539 | 0.875 | 7496 | 0.875 | 0.017 |
| 9.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.427 | 0.505 | 0.091 | Test 4 | -0.07983 | 0.3381 | 0.07986 | 2.86 | 433.8 | 0.511 | 7496 | 0.5103 | 0.2406 | 0.04866 | 0.4353 | 0.1354 | 125.6 | 0.861 | 7496 | 0.861 | 0.1295 | | 0.03 | 0.0203 | 0.0578 | 2.1808 | 0.866 | 7496 | 0.866 | 0.017 |
| 11.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.463 | 0.457 | 0.089 | Test 5 | -0.06724 | 0.3653 | 0.1518 | 2.86 | 374.8 | 0.61 | 7496 | 0.6101 | 0.2236 | 0.01987 | 0.4006 | 0.1756 | 213.4 | 0.771 | 7496 | 0.771 | 0.1687 | | 0.03 | 0.0132 | 0.0574 | 2.2408 | 0.853 | 7496 | 0.853 | 0.017 |
| 13.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.470 | 0.376 | 0.087 | Test 6 | -0.07475 | -0.2491 | 0.3065 | 2.86 | 376.6 | 0.608 | 7496 | 0.6082 | 0.2241 | -0.06236 | -0.1894 | 0.2499 | 436.1 | 0.458 | 7496 | 0.458 | 0.2412 | | 0.0302 | -0.057 | 0.0047 | 2.3178 | 0.839 | 7496 | 0.839 | 0.018 |
| 15.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.410 | 0.337 | 0.085 | Test 7 | -0.1383 | -0.1268 | 0.2405 | 2.86 | 472.2 | 0.37 | 7496 | 0.3696 | 0.251 | -0.1214 | -0.0982 | 0.1917 | 498.8 | 0.259 | 7496 | 0.258 | 0.258 | | 0.0302 | -0.053 | 0.0108 | 2.3886 | 0.824 | 7496 | 0.824 | 0.018 |
| 17.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.380 | 0.325 | 0.083 | Test 8 | -0.1281 | 0.2481 | -0.0436 | 2.86 | 506.8 | 0.32 | 7496 | 0.3193 | 0.26 | -0.134 | 0.1816 | -0.0579 | 474.1 | 0.223 | 7496 | 0.223 | 0.2515 | | 0.0304 | 0.0439 | 0.0288 | 2.4618 | 0.808 | 7496 | 0.807 | 0.018 |
| 19.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.353 | 0.211 | 0.081 | Test 9 | -0.1206 | 0.1201 | -0.1993 | 2.86 | 530.7 | 0.277 | 7496 | 0.2764 | 0.2661 | -0.09719 | 0.07577 | -0.0852 | 664 | 0.068 | 7496 | 0.068 | 0.2976 | | 0.0303 | 0.0469 | -0.019 | 2.5055 | 0.794 | 7496 | 0.794 | 0.018 |

| Location | Loading Parameters | | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25.5 | 1 | 0.15102 | 2.120 | 0.392947 | 0.291 | 0.307 | 0.075 | Test 10 | -0.053 | -0.0828 | -0.2232 | 2.86 | 556.1 | 0.277 | 7496 | 0.2763 | 0.2724 | -0.03566 | -0.1131 | -0.2466 | 410.3 | 0.402 | 7496 | 0.402 | 0.2339 | 0.0304 | 0.013 | -0.042 | 2.5838 | 0.74 | 7496 | 0.74 | 0.019 |
| 25.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.252 | 0.339 | 0.075 | Test 11 | -0.04735 | -0.0232 | 0.2029 | 2.86 | 607.3 | 0.205 | 7496 | 0.2045 | 0.2846 | -0.05328 | -0.01951 | 0.2848 | 355.1 | 0.463 | 7496 | 0.462 | 0.2176 | 0.0304 | -0.029 | 0.0333 | 2.5847 | 0.739 | 7496 | 0.739 | 0.019 |
| 19.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.398 | 0.323 | 0.081 | Test 12 | -0.07738 | -0.3036 | 0.1025 | 2.86 | 398.7 | 0.491 | 7496 | 0.4911 | 0.2306 | -0.1062 | -0.2046 | 0.0706 | 414.5 | 0.298 | 7496 | 0.297 | 0.2352 | 0.0302 | -0.047 | -0.019 | 2.4964 | 0.795 | 7496 | 0.794 | 0.018 |
| 17.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.421 | 0.330 | 0.083 | Test 13 | -0.07935 | 0.1606 | 0.3014 | 2.86 | 342.6 | 0.561 | 7496 | 0.5605 | 0.2138 | -0.101 | 0.1072 | 0.2019 | 399.8 | 0.329 | 7496 | 0.329 | 0.231 | 0.0303 | -0.013 | 0.0509 | 2.4461 | 0.81 | 7496 | 0.809 | 0.018 |
| 11.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.481 | 0.396 | 0.089 | Test 14 | -0.00998 | 0.1308 | 0.452 | 2.86 | 101.3 | 0.891 | 7496 | 0.8912 | 0.1163 | 0.005402 | 0.1146 | 0.3733 | 239.2 | 0.705 | 7496 | 0.705 | 0.1786 | 0.03 | -0.028 | 0.0515 | 2.2039 | 0.854 | 7496 | 0.854 | 0.017 |
| 9.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.460 | 0.446 | 0.091 | Test 15 | -0.00176 | 0.438 | -0.1341 | 2.86 | 133.6 | 0.855 | 7496 | 0.8548 | 0.1335 | 0.02842 | 0.3913 | -0.1448 | 175.3 | 0.788 | 7496 | 0.788 | 0.1529 | 0.0299 | 0.0533 | 0.03 | 2.1446 | 0.867 | 7496 | 0.867 | 0.017 |
| 7.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.452 | 0.430 | 0.093 | Test 16 | 0.0078 | 0.4353 | -0.0908 | 2.86 | 146.1 | 0.835 | 7496 | 0.8353 | 0.1396 | 0.03187 | 0.3853 | -0.1005 | 187.6 | 0.76 | 7496 | 0.76 | 0.1582 | 0.0298 | 0.0526 | 0.036 | 2.1185 | 0.878 | 7496 | 0.878 | 0.017 |
| 5.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.419 | 0.395 | 0.096 | Test 17 | 0.01644 | -0.1652 | 0.3671 | 2.86 | 244.9 | 0.713 | 7496 | 0.7126 | 0.1808 | 0.02936 | -0.1462 | 0.3354 | 231.7 | 0.684 | 7496 | 0.684 | 0.1758 | 0.0295 | -0.064 | 0.0165 | 2.1149 | 0.886 | 7496 | 0.886 | 0.017 |
| 3.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.388 | 0.323 | 0.098 | Test 18 | 0.04148 | -0.1145 | 0.3269 | 2.86 | 370.6 | 0.548 | 7496 | 0.5481 | 0.2224 | 0.01577 | -0.1304 | 0.2786 | 317.8 | 0.528 | 7496 | 0.527 | 0.2059 | 0.0292 | -0.068 | 0.0138 | 2.0985 | 0.895 | 7496 | 0.895 | 0.017 |
| 1.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.348 | 0.231 | 0.100 | Test 19 | 0.05183 | 0.2435 | -0.1693 | 2.86 | 431.8 | 0.433 | 7496 | 0.4329 | 0.24 | 0.009317 | 0.197 | -0.1018 | 454 | 0.289 | 7496 | 0.289 | 0.2461 | 0.0288 | 0.0613 | 0.0355 | 2.05 | 0.902 | 7496 | 0.902 | 0.017 |
| -0.5 | 3 | 0.15102 | 2.120 | 0.392947 | 0.241 | 0.094 | 0.101 | Test 20 | 0.03648 | -0.1974 | -0.0543 | 2.86 | 570.6 | 0.216 | 7496 | 0.2157 | 0.2759 | -0.04275 | -0.01359 | -0.0497 | 772.8 | 0.013 | 7496 | 0.012 | 0.3211 | 0.0286 | -0.012 | -0.071 | 1.9304 | 0.911 | 7496 | 0.911 | 0.016 |
| -0.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.172 | 0.230 | 0.101 | Test 22 | 0.06125 | 0.1102 | -0.0146 | 2.86 | 878.5 | 0.05 | 7496 | 0.0497 | 0.3423 | -0.1361 | -0.09221 | 0.0151 | 872.9 | 0.036 | 7496 | 0.036 | 0.3412 | 0.0285 | 0.042 | 0.0591 | 1.9134 | 0.912 | 7496 | 0.911 | 0.016 |
| 1.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.329 | 0.203 | 0.100 | Test 23 | 0.08146 | -0.1798 | 0.1703 | 2.86 | 682.5 | 0.252 | 7496 | 0.2517 | 0.3018 | 0.007903 | -0.1729 | 0.0895 | 624.3 | 0.186 | 7496 | 0.185 | 0.2886 | 0.0287 | -0.065 | -0.028 | 2.0256 | 0.904 | 7496 | 0.904 | 0.016 |
| 3.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.378 | 0.297 | 0.098 | Test 24 | 0.04779 | 0.05607 | -0.3256 | 2.86 | 513.6 | 0.444 | 7496 | 0.4433 | 0.2617 | 0.000386 | 0.0913 | -0.2822 | 427.2 | 0.436 | 7496 | 0.436 | 0.2387 | 0.029 | 0.0654 | -0.022 | 2.0877 | 0.895 | 7496 | 0.895 | 0.017 |
| 5.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.387 | 0.359 | 0.095 | Test 25 | 0.02088 | 0.03311 | 0.3649 | 2.86 | 419.2 | 0.546 | 7496 | 0.5455 | 0.2365 | 0.01893 | 0.005924 | 0.3403 | 362 | 0.545 | 7496 | 0.545 | 0.2197 | 0.029 | -0.049 | 0.0449 | 2.0731 | 0.888 | 7496 | 0.888 | 0.017 |
| 7.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.434 | 0.337 | 0.093 | Test 26 | -0.01318 | 0.1504 | 0.3932 | 2.86 | 243.2 | 0.732 | 7496 | 0.732 | 0.1801 | 0.07347 | 0.09438 | 0.246 | 744.1 | 0.259 | 7496 | 0.259 | 0.3151 | 0.0297 | -0.027 | 0.0577 | 2.0814 | 0.879 | 7496 | 0.879 | 0.017 |
| 9.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.460 | 0.404 | 0.091 | Test 27 | -0.02374 | 0.4055 | -0.1616 | 2.86 | 234.8 | 0.753 | 7496 | 0.7526 | 0.177 | 0.006103 | 0.3698 | -0.1477 | 204.2 | 0.744 | 7496 | 0.744 | 0.165 | 0.0298 | 0.0549 | 0.0274 | 2.1179 | 0.87 | 7496 | 0.87 | 0.017 |
| 11.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.483 | 0.357 | 0.089 | Test 28 | -0.02954 | 0.4011 | -0.2124 | 2.86 | 179.9 | 0.811 | 7496 | 0.811 | 0.1549 | -0.04785 | 0.2562 | -0.1738 | 351.3 | 0.506 | 7496 | 0.506 | 0.2165 | 0.0299 | 0.0564 | 0.0175 | 2.1757 | 0.857 | 7496 | 0.857 | 0.017 |
| 17.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.442 | 0.347 | 0.083 | Test 29 | -0.03598 | -0.4056 | -0.0149 | 2.86 | 273 | 0.694 | 7496 | 0.6934 | 0.1908 | -0.08059 | -0.2654 | -0.024 | 381.5 | 0.411 | 7496 | 0.411 | 0.2256 | 0.0302 | -0.04 | -0.035 | 2.3741 | 0.814 | 7496 | 0.814 | 0.018 |
| 19.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.424 | 0.358 | 0.081 | Test 30 | -0.04493 | 0.3711 | -0.0789 | 2.86 | 336.8 | 0.616 | 7496 | 0.6155 | 0.212 | -0.06993 | 0.2846 | -0.0457 | 372 | 0.456 | 7496 | 0.456 | 0.2228 | 0.0302 | 0.0436 | 0.0259 | 2.4226 | 0.8 | 7496 | 0.799 | 0.018 |
| 25.5 | 5 | 0.15102 | 2.120 | 0.392947 | 0.425 | 0.355 | 0.074 | Test 31 | -0.0359 | 0.05097 | 0.3858 | 2.86 | 233.1 | 0.709 | 7496 | 0.7088 | 0.1763 | -0.05777 | 0.01349 | 0.297 | 330 | 0.501 | 7496 | 0.501 | 0.2098 | 0.0303 | -0.022 | 0.0382 | 2.5456 | 0.742 | 7496 | 0.742 | 0.018 |
| 25.5 | 7 | 0.15102 | 2.120 | 0.392947 | 0.433 | 0.373 | 0.074 | Test 32 | -0.02969 | -0.3633 | 0.175 | 2.86 | 229.4 | 0.727 | 7496 | 0.7266 | 0.1749 | -0.05375 | -0.3015 | 0.1057 | 301.2 | 0.56 | 7496 | 0.56 | 0.2005 | 0.0303 | -0.043 | 0.0086 | 2.5502 | 0.741 | 7496 | 0.741 | 0.018 |
| 17.5 | 7 | 0.15102 | 2.120 | 0.392947 | 0.443 | 0.352 | 0.083 | Test 33 | -0.0365 | -0.1729 | 0.3674 | 2.86 | 319.9 | 0.659 | 7496 | 0.6589 | 0.2066 | 0.06904 | -0.1313 | 0.2506 | 680.4 | 0.306 | 7496 | 0.306 | 0.3013 | 0.0302 | -0.049 | 0.0192 | 2.3771 | 0.814 | 7496 | 0.814 | 0.018 |
| 11.5 | 7 | 0.15102 | 2.120 | 0.392947 | 0.452 | 0.408 | 0.089 | Test 34 | -0.03248 | 0.3508 | 0.2296 | 2.86 | 285.5 | 0.698 | 7496 | 0.6976 | 0.1952 | -0.02962 | 0.3211 | 0.2 | 208.8 | 0.72 | 7496 | 0.72 | 0.1669 | 0.0299 | 0.0144 | 0.0573 | 2.152 | 0.859 | 7496 | 0.859 | 0.017 |
| 9.5 | 7 | 0.15102 | 2.120 | 0.392947 | 0.433 | 0.346 | 0.091 | Test 35 | -0.02956 | 0.00616 | 0.4037 | 2.86 | 351.8 | 0.635 | 7496 | 0.6346 | 0.2166 | 0.0222 | 0.009168 | 0.3241 | 453.3 | 0.465 | 7496 | 0.465 | 0.2459 | 0.0299 | -0.044 | 0.0426 | 2.1151 | 0.868 | 7496 | 0.868 | 0.017 |
| 5.5 | 7 | 0.15102 | 2.120 | 0.392947 | 0.346 | 0.358 | 0.096 | Test 36 | 0.01173 | -0.2916 | 0.1632 | 2.86 | 592.2 | 0.414 | 7496 | 0.4139 | 0.2811 | 0.006338 | -0.3127 | 0.1599 | 400 | 0.536 | 7496 | 0.536 | 0.231 | 0.0296 | -0.059 | -0.031 | 2.0522 | 0.89 | 7496 | 0.89 | 0.017 |
| 3.5 | 7 | 0.15102 | 2.120 | 0.392947 | 0.311 | 0.294 | 0.097 | Test 37 | 0.0347 | 0.2187 | 0.1686 | 2.86 | 711.9 | 0.287 | 7496 | 0.2862 | 0.3082 | -0.00575 | 0.2088 | 0.1983 | 530.2 | 0.37 | 7496 | 0.37 | 0.2659 | 0.0288 | -0.012 | 0.0674 | 2.0604 | 0.895 | 7496 | 0.895 | 0.017 |
| 1.5 | 7 | 0.15102 | 2.120 | 0.392947 | 0.287 | 0.193 | 0.099 | Test 38 | 0.06974 | 0.1812 | -0.119 | 2.86 | 839.2 | 0.174 | 7496 | 0.1732 | 0.3346 | -0.00867 | 0.1743 | -0.0603 | 760.7 | 0.144 | 7496 | 0.143 | 0.3186 | 0.0284 | 0.0558 | 0.0435 | 1.9682 | 0.905 | 7496 | 0.905 | 0.016 |
| -0.5 | 7 | 0.15102 | 2.120 | 0.392947 | 0.177 | 0.213 | 0.100 | Test 39 | 0.07135 | 0.05059 | -0.0932 | 2.86 | 1016 | 0.04 | 7496 | 0.0395 | 0.3681 | -0.03637 | -0.1427 | 0.1049 | 1201 | 0.089 | 7496 | 0.089 | 0.4003 | 0.0282 | 0.0682 | 0.0239 | 1.8649 | 0.913 | 7496 | 0.913 | 0.016 |
| -0.5 | 9 | 0.15102 | 2.120 | 0.392947 | 0.109 | 0.065 | 0.101 | Test 40 | 0.04503 | -0.0427 | 0.04701 | 2.86 | 1133 | 0.013 | 7496 | 0.0128 | 0.3889 | -0.03625 | -0.00551 | -0.0283 | 1173 | 0.003 | 7496 | 0.002 | 0.3956 | 0.0282 | -0.072 | 0.0071 | 1.8967 | 0.912 | 7496 | 0.912 | 0.016 |
| 5.5 | 9 | 0.15102 | 2.120 | 0.392947 | 0.284 | 0.213 | 0.095 | Test 41 | 0.0003 | -0.1121 | 0.2603 | 2.86 | 685.6 | 0.305 | 7496 | 0.305 | 0.3024 | 0.08541 | -0.04847 | 0.1182 | 939.2 | 0.061 | 7496 | 0.061 | 0.354 | 0.0293 | -0.063 | 0.0205 | 2.0372 | 0.889 | 7496 | 0.889 | 0.017 |
| 9.5 | 9 | 0.15102 | 2.120 | 0.392947 | 0.349 | 0.412 | 0.090 | Test 42 | -0.0186 | -0.2543 | 0.2107 | 2.86 | 571.5 | 0.417 | 7496 | 0.4169 | 0.2761 | -0.05014 | -0.2984 | 0.205 | 302.6 | 0.619 | 7496 | 0.619 | 0.2009 | 0.0296 | -0.06 | 0.0069 | 2.0962 | 0.869 | 7496 | 0.869 | 0.017 |
| 11.5 | 9 | 0.15102 | 2.120 | 0.392947 | 0.435 | 0.388 | 0.082 | Test 43 | -0.04627 | -0.2765 | 0.2733 | 2.86 | 377.8 | 0.6 | 7496 | 0.5999 | 0.2245 | -0.07349 | -0.2404 | 0.2024 | 347.6 | 0.516 | 7496 | 0.516 | 0.2153 | 0.0298 | -0.052 | 0.0035 | 2.36 | 0.814 | 7496 | 0.814 | 0.018 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R033 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.293 | 0.232 | 0.089 | Test 1 | 0.02387 | 0.2632 | 0.05736 | 3.31 | 339 | 0.445 | 7496 | 0.4451 | 0.2127 | 0.05035 | 0.1669 | 0.0706 | 488.8 | 0.201 | 7496 | 0.201 | 0.2554 | 0.027 | 0.0071 | 0.0621 | 1.0292 | 0.934 | 7496 | 0.934 | 0.012 |
| 1.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.378 | 0.361 | 0.089 | Test 2 | 0.03997 | 0.2114 | 0.2633 | 3.31 | 195 | 0.687 | 7496 | 0.6867 | 0.1613 | 0.0409 | 0.1528 | 0.2817 | 144.3 | 0.727 | 7496 | 0.727 | 0.1388 | 0.0285 | -0.026 | 0.0544 | 0.9913 | 0.932 | 7496 | 0.932 | 0.012 |
| 3.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.392 | 0.427 | 0.087 | Test 3 | 0.02294 | -0.3475 | -0.1254 | 3.31 | 167.7 | 0.753 | 7496 | 0.753 | 0.1496 | 0.05374 | -0.3366 | -0.1613 | 59.86 | 0.897 | 7496 | 0.897 | 0.0894 | 0.029 | -0.015 | -0.056 | 0.9939 | 0.926 | 7496 | 0.926 | 0.012 |
| 5.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.405 | 0.458 | 0.084 | Test 4 | 0.00844 | 0.2854 | -0.2755 | 3.31 | 194.6 | 0.752 | 7496 | 0.752 | 0.1611 | 0.05877 | 0.3245 | -0.2333 | 63.05 | 0.905 | 7496 | 0.905 | 0.0917 | 0.0292 | 0.0533 | 0.0134 | 1.0291 | 0.917 | 7496 | 0.917 | 0.012 |
| 7.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.417 | 0.487 | 0.081 | Test 5 | -0.01767 | 0.1643 | 0.364 | 3.31 | 298.1 | 0.667 | 7496 | 0.6672 | 0.1994 | 0.05607 | 0.126 | 0.412 | 66.8 | 0.913 | 7496 | 0.912 | 0.0944 | 0.0292 | -0.022 | 0.0473 | 1.0322 | 0.908 | 7496 | 0.908 | 0.012 |
| 9.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.426 | 0.491 | 0.079 | Test 6 | -0.03021 | -0.1827 | -0.3509 | 3.31 | 334.2 | 0.637 | 7496 | 0.637 | 0.2111 | 0.04887 | -0.1824 | -0.4032 | 93.52 | 0.887 | 7496 | 0.887 | 0.1117 | 0.0292 | 0.0176 | -0.047 | 1.0295 | 0.9 | 7496 | 0.9 | 0.012 |
| 11.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.465 | 0.482 | 0.077 | Test 7 | -0.02007 | 0.4426 | -0.0422 | 3.31 | 226.2 | 0.766 | 7496 | 0.7661 | 0.1737 | 0.03444 | 0.4462 | -0.0291 | 123.1 | 0.859 | 7496 | 0.859 | 0.1282 | 0.0293 | 0.0379 | 0.0286 | 1.0339 | 0.891 | 7496 | 0.891 | 0.012 |
| 13.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.484 | 0.464 | 0.074 | Test 8 | -0.01245 | -0.2479 | 0.4007 | 3.31 | 142.9 | 0.854 | 7496 | 0.8534 | 0.1381 | 0.01732 | -0.2369 | 0.3787 | 143.8 | 0.839 | 7496 | 0.839 | 0.1385 | 0.0292 | -0.044 | 0.0122 | 1.0502 | 0.88 | 7496 | 0.88 | 0.012 |
| 17.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.438 | 0.360 | 0.071 | Test 9 | -0.05501 | -0.1475 | 0.3532 | 3.31 | 281.9 | 0.661 | 7496 | 0.6608 | 0.1939 | -0.08448 | -0.1192 | 0.2487 | 437.5 | 0.395 | 7496 | 0.394 | 0.2416 | 0.0297 | -0.033 | 0.025 | 1.1328 | 0.851 | 7496 | 0.851 | 0.012 |
| 25.5 | 1 | 0.15 | 1.898 | 0.382557 | 0.407 | 0.290 | 0.063 | Test 10 | -0.01664 | 0.3548 | -0.163 | 3.31 | 127 | 0.818 | 7496 | 0.8182 | 0.1302 | -0.01536 | 0.2463 | -0.1221 | 422.9 | 0.401 | 7496 | 0.401 | 0.2375 | 0.0298 | 0.0336 | 0.0028 | 0.9497 | 0.818 | 7496 | 0.818 | 0.011 |
| 25.5 | 3 | 0.15 | 1.898 | 0.382557 | 0.405 | 0.410 | 0.063 | Test 11 | -0.02261 | -0.1343 | -0.3582 | 3.31 | 170.1 | 0.763 | 7496 | 0.7633 | 0.1506 | 0.01383 | -0.164 | -0.3603 | 137.2 | 0.811 | 7496 | 0.811 | 0.1353 | 0.0297 | 0.0001 | -0.034 | 0.9224 | 0.822 | 7496 | 0.822 | 0.011 |
| 17.5 | 3 | 0.15 | 1.898 | 0.382557 | 0.468 | 0.404 | 0.071 | Test 12 | -0.0169 | 0.2266 | -0.3897 | 3.31 | 70.07 | 0.916 | 7496 | 0.9158 | 0.0967 | -0.01744 | 0.1782 | -0.3434 | 164.6 | 0.773 | 7496 | 0.773 | 0.1482 | 0.0296 | 0.0357 | -0.021 | 1.1137 | 0.853 | 7496 | 0.853 | 0.012 |
| 13.5 | 3 | 0.15 | 1.898 | 0.382557 | 0.463 | 0.460 | 0.074 | Test 13 | 0.0055 | -0.1784 | -0.4214 | 3.31 | 64.61 | 0.924 | 7496 | 0.924 | 0.0928 | 0.02159 | -0.2108 | -0.3843 | 42.79 | 0.944 | 7496 | 0.944 | 0.0755 | 0.0293 | 0.0056 | -0.045 | 1.0472 | 0.879 | 7496 | 0.879 | 0.012 |
| 11.5 | 3 | 0.15 | 1.898 | 0.382557 | 0.468 | 0.471 | 0.077 | Test 14 | 0.00161 | -0.2681 | -0.3814 | 3.31 | 34.36 | 0.96 | 7496 | 0.9595 | 0.0677 | 0.03288 | -0.2746 | -0.3412 | 41.02 | 0.946 | 7496 | 0.946 | 0.074 | 0.0294 | 0.0009 | -0.047 | 1.025 | 0.892 | 7496 | 0.892 | 0.012 |
| 9.5 | 3 | 0.15 | 1.898 | 0.382557 | 0.462 | 0.460 | 0.079 | Test 15 | 0.0027 | 0.3214 | -0.3286 | 3.31 | 35.96 | 0.957 | 7496 | 0.9566 | 0.0693 | 0.03439 | 0.2741 | -0.3252 | 65.22 | 0.912 | 7496 | 0.912 | 0.0933 | 0.0294 | 0.0493 | 0.0062 | 1.017 | 0.901 | 7496 | 0.901 | 0.012 |
| 5.5 | 3 | 0.15 | 1.898 | 0.382557 | 0.441 | 0.415 | 0.084 | Test 16 | 0.01263 | -0.312 | -0.2929 | 3.31 | 75.66 | 0.901 | 7496 | 0.9007 | 0.1005 | 0.03084 | -0.2845 | -0.2579 | 83.99 | 0.868 | 7496 | 0.868 | 0.1059 | 0.0293 | -0.008 | -0.054 | 1.0071 | 0.918 | 7496 | 0.918 | 0.012 |
| 3.5 | 3 | 0.15 | 1.898 | 0.382557 | 0.413 | 0.350 | 0.087 | Test 17 | 0.02513 | -0.3843 | -0.0559 | 3.31 | 159.4 | 0.78 | 7496 | 0.78 | 0.1458 | 0.01445 | -0.3287 | -0.0688 | 168.3 | 0.715 | 7496 | 0.715 | 0.1498 | 0.029 | -0.035 | -0.046 | 0.9897 | 0.927 | 7496 | 0.927 | 0.012 |
| -0.5 | 3 | 0.15 | 1.898 | 0.382557 | 0.315 | 0.157 | 0.091 | Test 18 | 0.05454 | 0.1387 | -0.2209 | 3.31 | 450.6 | 0.362 | 7496 | 0.3614 | 0.2452 | -0.01997 | 0.08659 | -0.1063 | 596.5 | 0.106 | 7496 | 0.105 | 0.2821 | 0.028 | 0.0623 | 0.0056 | 0.9855 | 0.937 | 7496 | 0.937 | 0.012 |
| -0.5 | 5 | 0.15 | 1.898 | 0.382557 | 0.284 | 0.117 | 0.091 | Test 19 | 0.0775 | 0.2011 | -0.0479 | 3.31 | 632.6 | 0.202 | 7496 | 0.2019 | 0.2905 | -0.08 | 0.03074 | 0.0198 | 745.8 | 0.007 | 7496 | 0.006 | 0.3154 | 0.028 | 0.0434 | 0.045 | 0.9809 | 0.937 | 7496 | 0.937 | 0.011 |
| 5.5 | 5 | 0.15 | 1.898 | 0.382557 | 0.431 | 0.402 | 0.084 | Test 20 | -0.0123 | -0.0423 | -0.417 | 3.31 | 89.31 | 0.881 | 7496 | 0.8806 | 0.1092 | 0.01639 | -0.04452 | -0.3835 | 111.4 | 0.834 | 7496 | 0.834 | 0.1219 | 0.0292 | 0.0322 | -0.045 | 0.9978 | 0.919 | 7496 | 0.919 | 0.012 |
| 9.5 | 5 | 0.15 | 1.898 | 0.382557 | 0.460 | 0.368 | 0.079 | Test 21 | -0.03931 | 0.2499 | 0.3382 | 3.31 | 205.6 | 0.763 | 7496 | 0.7632 | 0.1656 | 0.000662 | 0.2085 | 0.3021 | 238.3 | 0.68 | 7496 | 0.679 | 0.1783 | 0.0293 | 0.0031 | 0.0495 | 0.9958 | 0.903 | 7496 | 0.903 | 0.012 |
| 11.5 | 5 | 0.15 | 1.898 | 0.382557 | 0.472 | 0.411 | 0.077 | Test 22 | -0.01751 | 0.2277 | 0.3934 | 3.31 | 60.17 | 0.928 | 7496 | 0.9279 | 0.0896 | 0.01144 | 0.2324 | 0.3249 | 230.3 | 0.722 | 7496 | 0.722 | 0.1753 | 0.0293 | 0.0028 | 0.0474 | 1.0098 | 0.893 | 7496 | 0.893 | 0.012 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R034 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.262 | 0.220 | 0.078 | Test 1 | 0.00406 | -0.1959 | -0.1681 | 4.05 | 399.9 | 0.385 | 7496 | 0.3843 | 0.231 | 0.03135 | -0.1649 | -0.0913 | 352.7 | 0.274 | 7496 | 0.274 | 0.2169 | 0.028 | -0.018 | -0.046 | 1.0526 | 0.898 | 7496 | 0.898 | 0.012 |
| 1.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.383 | 0.326 | 0.077 | Test 2 | 0.03831 | 0.3401 | 0.05636 | 4.05 | 189.1 | 0.702 | 7496 | 0.7019 | 0.1588 | 0.02552 | 0.2869 | 0.0884 | 133.2 | 0.717 | 7496 | 0.717 | 0.1333 | 0.0288 | 0.03 | 0.0382 | 0.9512 | 0.903 | 7496 | 0.903 | 0.011 |
| 3.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.431 | 0.385 | 0.076 | Test 3 | 0.0409 | -0.2527 | -0.2974 | 4.05 | 131.6 | 0.813 | 7496 | 0.8127 | 0.1325 | 0.03589 | -0.197 | -0.2881 | 45.7 | 0.909 | 7496 | 0.909 | 0.0781 | 0.029 | -0.005 | -0.046 | 0.891 | 0.901 | 7496 | 0.901 | 0.011 |
| 5.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.445 | 0.409 | 0.073 | Test 4 | 0.03282 | 0.3379 | 0.2363 | 4.05 | 129.4 | 0.831 | 7496 | 0.8313 | 0.1314 | 0.03868 | 0.2874 | 0.2343 | 44.39 | 0.921 | 7496 | 0.921 | 0.077 | 0.0289 | 0.0153 | 0.0412 | 0.7923 | 0.902 | 7496 | 0.901 | 0.01 |
| 7.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.452 | 0.437 | 0.070 | Test 5 | 0.02876 | 0.3332 | 0.2611 | 4.05 | 157.4 | 0.81 | 7496 | 0.8101 | 0.1449 | 0.04399 | 0.2959 | 0.2591 | 41.07 | 0.934 | 7496 | 0.934 | 0.074 | 0.0286 | 0.0155 | 0.0386 | 0.6786 | 0.905 | 7496 | 0.905 | 0.01 |
| 9.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.442 | 0.457 | 0.068 | Test 6 | 0.01991 | -0.36 | 0.2196 | 4.05 | 178.1 | 0.789 | 7496 | 0.7891 | 0.1541 | 0.0448 | -0.3541 | 0.2115 | 44.86 | 0.934 | 7496 | 0.934 | 0.0774 | 0.0284 | -0.039 | 0.0032 | 0.5731 | 0.909 | 7496 | 0.909 | 0.009 |
| 11.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.456 | 0.460 | 0.065 | Test 7 | 0.01638 | -0.4348 | -0.0675 | 4.05 | 100.5 | 0.878 | 7496 | 0.8783 | 0.1158 | 0.03619 | -0.4192 | -0.0606 | 62.82 | 0.915 | 7496 | 0.915 | 0.0915 | 0.0282 | -0.033 | -0.017 | 0.4559 | 0.918 | 7496 | 0.918 | 0.008 |

| Location | Loading Parameters | | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.470 | 0.459 | 0.063 | Test 8 | 0.0131 | -0.2924 | -0.3506 | 4.05 | 46.07 | 0.944 | 7496 | 0.9443 | 0.0784 | 0.0284 | -0.2877 | -0.3205 | 64.49 | 0.915 | 7496 | 0.915 | 0.0928 | 0.0281 | -0.02 | -0.029 | 0.4012 | 0.92 | 7496 | 0.92 | 0.007 |
| 17.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.436 | 0.421 | 0.062 | Test 9 | 0.00052 | -0.1074 | 0.422 | 4.05 | 25.76 | 0.965 | 7496 | 0.965 | 0.0586 | 0.006762 | -0.09457 | 0.4035 | 26.74 | 0.96 | 7496 | 0.96 | 0.0597 | 0.0284 | 0.0066 | 0.0327 | 0.3433 | 0.924 | 7496 | 0.924 | 0.007 |
| 25.5 | 1 | 0.15645 | 1.549 | 0.376137 | 0.369 | 0.357 | 0.065 | Test 10 | 0.00337 | 0.0182 | 0.365 | 4.05 | 21.52 | 0.959 | 7496 | 0.9588 | 0.0536 | 0.0127 | 0.04419 | 0.3417 | 13.18 | 0.971 | 7496 | 0.971 | 0.0419 | 0.0298 | 0.0179 | 0.0309 | 0.4816 | 0.908 | 7496 | 0.908 | 0.008 |
| 25.5 | 3 | 0.15645 | 1.549 | 0.376137 | 0.382 | 0.384 | 0.066 | Test 11 | 0.00266 | -0.365 | -0.1016 | 4.05 | 20.56 | 0.963 | 7496 | 0.9632 | 0.0524 | 0.02058 | -0.3535 | -0.0835 | 45.19 | 0.916 | 7496 | 0.916 | 0.0776 | 0.0297 | -0.036 | 0.0032 | 0.4572 | 0.914 | 7496 | 0.914 | 0.008 |
| 17.5 | 3 | 0.15645 | 1.549 | 0.376137 | 0.441 | 0.423 | 0.062 | Test 12 | 0.00548 | 0.4097 | -0.1479 | 4.05 | 22.08 | 0.97 | 7496 | 0.9699 | 0.0543 | 0.01234 | 0.3786 | -0.1593 | 15.63 | 0.976 | 7496 | 0.976 | 0.0457 | 0.0283 | 0.0301 | -0.015 | 0.3232 | 0.928 | 7496 | 0.928 | 0.007 |
| 13.5 | 3 | 0.15645 | 1.549 | 0.376137 | 0.462 | 0.445 | 0.063 | Test 13 | 0.0149 | -0.054 | 0.4434 | 4.05 | 23.52 | 0.97 | 7496 | 0.9695 | 0.056 | 0.02425 | -0.02908 | 0.4199 | 14.8 | 0.978 | 7496 | 0.978 | 0.0444 | 0.028 | -0.011 | 0.0335 | 0.3714 | 0.926 | 7496 | 0.926 | 0.007 |
| 11.5 | 3 | 0.15645 | 1.549 | 0.376137 | 0.458 | 0.446 | 0.065 | Test 14 | 0.01768 | -0.4403 | 0.01501 | 4.05 | 24.34 | 0.968 | 7496 | 0.9676 | 0.057 | 0.02992 | -0.4126 | 0.0543 | 17.39 | 0.974 | 7496 | 0.974 | 0.0482 | 0.0281 | -0.036 | 0.0075 | 0.4401 | 0.921 | 7496 | 0.921 | 0.008 |
| 9.5 | 3 | 0.15645 | 1.549 | 0.376137 | 0.454 | 0.437 | 0.067 | Test 15 | 0.01753 | 0.4359 | 0.01722 | 4.05 | 23.93 | 0.968 | 7496 | 0.9676 | 0.0565 | 0.03165 | 0.4046 | -0.0143 | 22.01 | 0.965 | 7496 | 0.965 | 0.0542 | 0.0283 | 0.0366 | 0.0139 | 0.537 | 0.915 | 7496 | 0.915 | 0.009 |
| 5.5 | 3 | 0.15645 | 1.549 | 0.376137 | 0.433 | 0.390 | 0.073 | Test 16 | 0.01853 | -0.3262 | 0.2553 | 4.05 | 42.39 | 0.938 | 7496 | 0.9382 | 0.0752 | 0.02064 | -0.2831 | 0.2377 | 32.61 | 0.94 | 7496 | 0.94 | 0.066 | 0.0288 | -0.042 | 0.0118 | 0.7908 | 0.901 | 7496 | 0.901 | 0.01 |
| 3.5 | 3 | 0.15645 | 1.549 | 0.376137 | 0.415 | 0.359 | 0.075 | Test 17 | 0.01653 | -0.395 | -0.054 | 4.05 | 67.97 | 0.898 | 7496 | 0.8976 | 0.0952 | 0.01078 | -0.345 | -0.0482 | 49.32 | 0.902 | 7496 | 0.902 | 0.0811 | 0.0288 | -0.039 | -0.025 | 0.8667 | 0.903 | 7496 | 0.903 | 0.011 |
| -0.5 | 3 | 0.15645 | 1.549 | 0.376137 | 0.275 | 0.151 | 0.079 | Test 18 | 0.02354 | -0.1437 | -0.2063 | 4.05 | 467.9 | 0.336 | 7496 | 0.3359 | 0.2498 | -0.03477 | -0.0537 | -0.1032 | 603.7 | 0.078 | 7496 | 0.077 | 0.2838 | 0.0281 | 0.0096 | -0.05 | 0.9323 | 0.912 | 7496 | 0.912 | 0.011 |
| -0.5 | 5 | 0.15645 | 1.549 | 0.376137 | 0.275 | 0.132 | 0.079 | Test 19 | 0.0226 | 0.229 | -0.1069 | 4.05 | 545.6 | 0.305 | 7496 | 0.3048 | 0.2698 | 0.003291 | 0.09101 | -0.0917 | 698 | 0.082 | 7496 | 0.082 | 0.3052 | 0.0282 | 0.0495 | 0.0112 | 0.9292 | 0.912 | 7496 | 0.912 | 0.011 |
| 5.5 | 5 | 0.15645 | 1.549 | 0.376137 | 0.428 | 0.353 | 0.073 | Test 20 | 0.00105 | 0.426 | -0.0202 | 4.05 | 36.16 | 0.95 | 7496 | 0.9496 | 0.0695 | -0.00476 | 0.3459 | -0.0358 | 146.9 | 0.755 | 7496 | 0.755 | 0.14 | 0.0287 | 0.0405 | 0.0168 | 0.78 | 0.902 | 7496 | 0.902 | 0.01 |
| 9.5 | 5 | 0.15645 | 1.549 | 0.376137 | 0.448 | 0.421 | 0.067 | Test 21 | -0.02061 | -0.0339 | 0.4263 | 4.05 | 203 | 0.772 | 7496 | 0.7715 | 0.1645 | 0.02007 | -0.02754 | 0.3998 | 52.63 | 0.92 | 7496 | 0.92 | 0.0838 | 0.0282 | -0.018 | 0.0345 | 0.5259 | 0.915 | 7496 | 0.915 | 0.008 |
| 11.5 | 5 | 0.15645 | 1.549 | 0.376137 | 0.441 | 0.411 | 0.065 | Test 22 | 0.00083 | 0.4392 | 0.03097 | 4.05 | 166.4 | 0.814 | 7496 | 0.8136 | 0.149 | 0.004341 | 0.4066 | 0.0074 | 201.6 | 0.755 | 7496 | 0.755 | 0.164 | 0.0279 | 0.0351 | 0.0108 | 0.4181 | 0.924 | 7496 | 0.924 | 0.008 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R035 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.289 | 0.301 | 0.112 | Test 1 | 0.0166 | 0.1207 | -0.2437 | 2.48 | 187.2 | 0.597 | 7496 | 0.5969 | 0.158 | 0.05087 | 0.1685 | -0.1843 | 161.6 | 0.591 | 7496 | 0.591 | 0.1468 | 0.026 | 0.0765 | 0.0398 | 2.695 | 0.912 | 7496 | 0.912 | 0.019 |
| 1.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.271 | 0.349 | 0.112 | Test 2 | 0.00384 | 0.1058 | 0.2452 | 2.48 | 331.8 | 0.446 | 7496 | 0.4461 | 0.2104 | 0.09354 | 0.003173 | 0.2552 | 422.8 | 0.366 | 7496 | 0.366 | 0.2375 | 0.0268 | -0.08 | 0.0288 | 2.7833 | 0.907 | 7496 | 0.907 | 0.019 |
| 3.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.352 | 0.287 | 0.110 | Test 3 | -0.00572 | 0.08935 | 0.3345 | 2.48 | 233.2 | 0.658 | 7496 | 0.6582 | 0.1764 | 0.03868 | -0.03866 | 0.2451 | 3744 | 0.058 | 7496 | 0.058 | 0.7067 | 0.0267 | -0.081 | 0.0202 | 2.8576 | 0.9 | 7496 | 0.9 | 0.02 |
| 5.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.395 | 0.507 | 0.108 | Test 4 | 0.00817 | -0.3777 | 0.08494 | 2.48 | 291.6 | 0.658 | 7496 | 0.6583 | 0.1972 | 0.06789 | -0.4383 | 0.0263 | 179 | 0.802 | 7496 | 0.801 | 0.1545 | 0.027 | -0.033 | -0.074 | 2.9544 | 0.893 | 7496 | 0.893 | 0.02 |
| 7.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.465 | 0.485 | 0.106 | Test 5 | 0.00124 | 0.1391 | 0.4426 | 2.48 | 271.7 | 0.748 | 7496 | 0.7481 | 0.1904 | 0.02647 | 0.1272 | 0.4407 | 426.1 | 0.649 | 7496 | 0.649 | 0.2384 | 0.0272 | -0.069 | 0.038 | 3.0116 | 0.885 | 7496 | 0.884 | 0.02 |
| 9.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.404 | 0.362 | 0.104 | Test 6 | -0.1402 | -0.2482 | 0.08813 | 2.48 | 461.3 | 0.361 | 7496 | 0.3603 | 0.2481 | -0.09121 | -0.2634 | 0.0633 | 432.4 | 0.389 | 7496 | 0.389 | 0.2402 | 0.0275 | -0.027 | -0.071 | 3.0854 | 0.876 | 7496 | 0.876 | 0.02 |
| 11.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.408 | 0.368 | 0.102 | Test 7 | -0.1612 | -0.2462 | 0.01987 | 2.48 | 422.2 | 0.351 | 7496 | 0.3511 | 0.2373 | -0.1397 | -0.2268 | 0.0271 | 432.3 | 0.312 | 7496 | 0.311 | 0.2401 | 0.0277 | -0.012 | -0.073 | 3.1877 | 0.866 | 7496 | 0.866 | 0.021 |
| 13.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.394 | 0.361 | 0.100 | Test 8 | -0.1793 | -0.0187 | 0.2135 | 2.48 | 454.3 | 0.275 | 7496 | 0.2746 | 0.2462 | -0.1711 | 0.000126 | 0.1894 | 446.5 | 0.232 | 7496 | 0.231 | 0.2441 | 0.0279 | -0.071 | 0.0103 | 3.3641 | 0.852 | 7496 | 0.852 | 0.021 |
| 15.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.361 | 0.339 | 0.098 | Test 9 | -0.1878 | 0.1649 | 0.05432 | 2.48 | 517.2 | 0.179 | 7496 | 0.1791 | 0.2627 | -0.18 | 0.1584 | 0.0167 | 475.5 | 0.167 | 7496 | 0.166 | 0.2519 | 0.0281 | 0.0099 | 0.0694 | 3.524 | 0.84 | 7496 | 0.84 | 0.022 |
| 17.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.308 | 0.290 | 0.096 | Test 10 | -0.1739 | 0.05912 | -0.1207 | 2.48 | 616.9 | 0.099 | 7496 | 0.0987 | 0.2869 | -0.1591 | 0.04403 | -0.1234 | 591.5 | 0.098 | 7496 | 0.098 | 0.2809 | 0.0282 | 0.0657 | -0.018 | 3.6901 | 0.826 | 7496 | 0.826 | 0.022 |
| 25.5 | 1 | 0.17654 | 2.506 | 0.468934 | 0.127 | 0.100 | 0.089 | Test 11 | -0.06314 | -0.0123 | -0.0627 | 2.48 | 818.5 | 0.018 | 7496 | 0.018 | 0.3305 | -0.04638 | 0.03504 | -0.0411 | 692.9 | 0.016 | 7496 | 0.015 | 0.304 | 0.0286 | -0.014 | -0.058 | 4.1612 | 0.765 | 7496 | 0.765 | 0.024 |
| 25.5 | 3 | 0.17654 | 2.506 | 0.468934 | 0.486 | 0.452 | 0.088 | Test 12 | -0.03127 | 0.2967 | 0.3441 | 2.48 | 91.15 | 0.895 | 7496 | 0.8946 | 0.1103 | 0.007677 | 0.3176 | 0.3104 | 76.24 | 0.907 | 7496 | 0.907 | 0.1009 | 0.0286 | 0.0054 | 0.0596 | 4.1485 | 0.764 | 7496 | 0.764 | 0.024 |
| 17.5 | 3 | 0.17654 | 2.506 | 0.468934 | 0.516 | 0.484 | 0.096 | Test 13 | -0.01778 | -0.3854 | 0.3154 | 2.48 | 133.5 | 0.875 | 7496 | 0.8744 | 0.1334 | 0.01113 | -0.3608 | 0.3051 | 191.4 | 0.814 | 7496 | 0.814 | 0.1598 | 0.0282 | -0.067 | -0.013 | 3.6876 | 0.826 | 7496 | 0.825 | 0.022 |
| 13.5 | 3 | 0.17654 | 2.506 | 0.468934 | 0.526 | 0.509 | 0.100 | Test 14 | 0.01416 | 0.5085 | 0.05869 | 2.48 | 260.1 | 0.791 | 7496 | 0.7905 | 0.1863 | 0.02095 | 0.4882 | 0.0092 | 227.7 | 0.797 | 7496 | 0.797 | 0.1743 | 0.0277 | 0.0375 | 0.0617 | 3.3343 | 0.854 | 7496 | 0.854 | 0.021 |
| 11.5 | 3 | 0.17654 | 2.506 | 0.468934 | 0.537 | 0.527 | 0.102 | Test 15 | 0.02241 | -0.4774 | 0.1917 | 2.48 | 174.5 | 0.851 | 7496 | 0.8504 | 0.1526 | 0.04051 | -0.4531 | 0.1769 | 155.9 | 0.851 | 7496 | 0.851 | 0.1442 | 0.0275 | -0.061 | -0.042 | 3.2008 | 0.866 | 7496 | 0.866 | 0.021 |
| 9.5 | 3 | 0.17654 | 2.506 | 0.468934 | 0.561 | 0.536 | 0.104 | Test 16 | 0.04827 | -0.2841 | -0.4273 | 2.48 | 215.2 | 0.821 | 7496 | 0.821 | 0.1694 | 0.05485 | -0.2594 | -0.4052 | 154.7 | 0.849 | 7496 | 0.849 | 0.1437 | 0.0273 | 0.0351 | -0.068 | 3.0623 | 0.877 | 7496 | 0.877 | 0.02 |
| 5.5 | 3 | 0.17654 | 2.506 | 0.468934 | 0.539 | 0.396 | 0.108 | Test 17 | 0.06295 | -0.0605 | -0.4724 | 2.48 | 238.8 | 0.781 | 7496 | 0.7807 | 0.1785 | 0.06653 | -0.03103 | -0.3282 | 1982 | 0.171 | 7496 | 0.17 | 0.5142 | 0.0268 | 0.0676 | -0.045 | 2.9174 | 0.894 | 7496 | 0.894 | 0.02 |
| 3.5 | 3 | 0.17654 | 2.506 | 0.468934 | 0.509 | 0.512 | 0.110 | Test 18 | 0.07989 | 0.2476 | 0.351 | 2.48 | 903 | 0.434 | 7496 | 0.4336 | 0.3471 | 0.08502 | 0.2033 | 0.3758 | 140.1 | 0.83 | 7496 | 0.83 | 0.1367 | 0.0268 | -0.047 | 0.0685 | 2.8495 | 0.901 | 7496 | 0.901 | 0.02 |
| -0.5 | 3 | 0.17654 | 2.506 | 0.468934 | 0.412 | 0.396 | 0.113 | Test 19 | 0.06446 | 0.08684 | -0.337 | 2.48 | 188.5 | 0.707 | 7496 | 0.7065 | 0.1586 | 0.06821 | 0.09235 | -0.3149 | 211.8 | 0.656 | 7496 | 0.656 | 0.1681 | 0.0264 | 0.0858 | 0.0083 | 2.7178 | 0.911 | 7496 | 0.911 | 0.019 |
| -0.5 | 5 | 0.17654 | 2.506 | 0.468934 | 0.437 | 0.381 | 0.113 | Test 20 | 0.01791 | 0.2751 | -0.3156 | 2.48 | 246.8 | 0.727 | 7496 | 0.727 | 0.1815 | 0.03989 | 0.2225 | -0.2588 | 488.5 | 0.472 | 7496 | 0.472 | 0.2553 | 0.0264 | 0.0861 | 0.0074 | 2.6653 | 0.913 | 7496 | 0.913 | 0.019 |
| 5.5 | 5 | 0.17654 | 2.506 | 0.468934 | 0.490 | 0.488 | 0.107 | Test 21 | 0.00219 | 0.4236 | -0.2418 | 2.48 | 158.7 | 0.849 | 7496 | 0.8489 | 0.1455 | 0.04008 | 0.384 | -0.2299 | 197.7 | 0.792 | 7496 | 0.792 | 0.1624 | 0.0267 | 0.0749 | 0.0298 | 2.9843 | 0.891 | 7496 | 0.891 | 0.02 |
| 9.5 | 5 | 0.17654 | 2.506 | 0.468934 | 0.507 | 0.490 | 0.103 | Test 22 | -0.01613 | -0.1807 | -0.4559 | 2.48 | 150.5 | 0.857 | 7496 | 0.8569 | 0.1417 | 0.01571 | -0.1465 | -0.4515 | 154 | 0.846 | 7496 | 0.846 | 0.1433 | 0.0271 | 0.0413 | -0.064 | 3.0324 | 0.878 | 7496 | 0.878 | 0.02 |
| 11.5 | 5 | 0.17654 | 2.506 | 0.468934 | 0.528 | 0.484 | 0.102 | Test 23 | -0.03869 | -0.3885 | -0.2978 | 2.48 | 144.6 | 0.861 | 7496 | 0.8613 | 0.1389 | 0.0104 | -0.3744 | -0.29 | 168.8 | 0.833 | 7496 | 0.833 | 0.15 | 0.0273 | 0.007 | -0.074 | 3.1423 | 0.868 | 7496 | 0.868 | 0.021 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R036 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.477 | 0.477 | 0.099 | Test 1 | 0.03743 | 0.3772 | 0.2264 | 3.51 | 166 | 0.814 | 7496 | 0.8137 | 0.1488 | 0.0977 | 0.3236 | 0.1984 | 147.7 | 0.785 | 7496 | 0.785 | 0.1404 | 0.021 | 0.0072 | 0.078 | 2.6228 | 0.898 | 7496 | 0.898 | 0.019 |
| 1.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.504 | 0.555 | 0.098 | Test 2 | 0.03113 | -0.1932 | 0.4318 | 3.51 | 204.6 | 0.804 | 7496 | 0.804 | 0.1652 | 0.1041 | -0.2506 | 0.3743 | 762.7 | 0.5 | 7496 | 0.499 | 0.319 | 0.022 | -0.076 | 0.0003 | 2.6103 | 0.891 | 7496 | 0.891 | 0.019 |
| 3.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.546 | 0.635 | 0.094 | Test 3 | 0.02396 | 0.4894 | 0.1819 | 3.51 | 229.3 | 0.817 | 7496 | 0.8169 | 0.1749 | 0.1064 | 0.4594 | 0.2609 | 203.8 | 0.837 | 7496 | 0.837 | 0.1649 | 0.0226 | 0.0096 | 0.0706 | 2.4806 | 0.885 | 7496 | 0.885 | 0.018 |
| 5.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.562 | 0.601 | 0.091 | Test 4 | 0.00478 | -0.249 | -0.4985 | 3.51 | 301.6 | 0.794 | 7496 | 0.7943 | 0.2006 | 0.05649 | -0.1696 | -0.5169 | 236.8 | 0.824 | 7496 | 0.824 | 0.1778 | 0.023 | 0.0339 | -0.059 | 2.4796 | 0.876 | 7496 | 0.876 | 0.018 |
| 7.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.607 | 0.617 | 0.089 | Test 5 | -0.01658 | -0.0304 | -0.5896 | 3.51 | 352.4 | 0.788 | 7496 | 0.7876 | 0.2168 | 0.04689 | 0.02073 | -0.5696 | 252.2 | 0.829 | 7496 | 0.829 | 0.1834 | 0.0235 | 0.0487 | -0.043 | 2.4193 | 0.868 | 7496 | 0.868 | 0.018 |
| 9.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.664 | 0.593 | 0.086 | Test 6 | -0.03285 | -0.1299 | 0.6181 | 3.51 | 314 | 0.827 | 7496 | 0.8266 | 0.2047 | 0.01101 | -0.1592 | 0.5602 | 456 | 0.736 | 7496 | 0.736 | 0.2466 | 0.0238 | -0.054 | 0.0315 | 2.3028 | 0.863 | 7496 | 0.863 | 0.018 |
| 11.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.696 | 0.622 | 0.083 | Test 7 | -0.01817 | 0.5531 | 0.3918 | 3.51 | 257.9 | 0.87 | 7496 | 0.8697 | 0.1855 | 0.02738 | 0.4568 | 0.3811 | 245.1 | 0.844 | 7496 | 0.844 | 0.1808 | 0.0238 | 0.0077 | 0.059 | 2.1631 | 0.86 | 7496 | 0.86 | 0.017 |
| 13.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.711 | 0.606 | 0.080 | Test 8 | -0.01952 | 0.4746 | -0.5027 | 3.51 | 190.5 | 0.904 | 7496 | 0.9039 | 0.1594 | 0.001575 | 0.4382 | -0.4165 | 154.8 | 0.899 | 7496 | 0.898 | 0.1437 | 0.0239 | 0.0561 | -0.004 | 1.9869 | 0.857 | 7496 | 0.857 | 0.016 |
| 15.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.722 | 0.411 | 0.077 | Test 9 | -0.03851 | -0.0014 | 0.6836 | 3.51 | 127.9 | 0.932 | 7496 | 0.9319 | 0.1306 | -0.01351 | -0.03911 | 0.3951 | 1964 | 0.231 | 7496 | 0.231 | 0.5118 | 0.0236 | -0.034 | 0.0413 | 1.7693 | 0.858 | 7496 | 0.858 | 0.015 |
| 17.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.713 | 0.581 | 0.074 | Test 10 | -0.0472 | -0.2342 | -0.623 | 3.51 | 123.7 | 0.931 | 7496 | 0.9307 | 0.1284 | 0.009748 | -0.1585 | -0.5493 | 88.21 | 0.933 | 7496 | 0.933 | 0.1085 | 0.0234 | 0.0097 | -0.05 | 1.6294 | 0.856 | 7496 | 0.856 | 0.015 |
| 25.5 | 1 | 0.19604 | 1.769 | 0.491783 | 0.608 | 0.507 | 0.064 | Test 11 | -0.05467 | -0.3522 | -0.4267 | 3.51 | 74.45 | 0.939 | 7496 | 0.9391 | 0.0997 | -0.00301 | -0.3328 | -0.3781 | 42.15 | 0.958 | 7496 | 0.958 | 0.075 | 0.023 | -0.02 | -0.036 | 0.9175 | 0.876 | 7496 | 0.876 | 0.011 |
| 25.5 | 3 | 0.19604 | 1.769 | 0.491783 | 0.592 | 0.541 | 0.064 | Test 12 | -0.04465 | 0.2952 | 0.4614 | 3.51 | 58.69 | 0.95 | 7496 | 0.9504 | 0.0885 | -0.02429 | 0.2966 | 0.4226 | 56.69 | 0.946 | 7496 | 0.946 | 0.087 | 0.023 | 0.017 | 0.0379 | 0.8881 | 0.879 | 7496 | 0.879 | 0.011 |
| 17.5 | 3 | 0.19604 | 1.769 | 0.491783 | 0.682 | 0.556 | 0.074 | Test 13 | -0.04858 | 0.5022 | -0.3858 | 3.51 | 136.3 | 0.917 | 7496 | 0.917 | 0.1348 | -0.00581 | 0.4485 | -0.3194 | 55.85 | 0.953 | 7496 | 0.953 | 0.0863 | 0.0232 | 0.0496 | -0.008 | 1.5187 | 0.862 | 7496 | 0.862 | 0.014 |
| 13.5 | 3 | 0.19604 | 1.769 | 0.491783 | 0.701 | 0.558 | 0.079 | Test 14 | -0.04454 | 0.5898 | -0.288 | 3.51 | 196.8 | 0.891 | 7496 | 0.8914 | 0.162 | -0.00068 | 0.5206 | -0.1987 | 137.6 | 0.894 | 7496 | 0.894 | 0.1355 | 0.0236 | 0.055 | 0.008 | 1.8748 | 0.861 | 7496 | 0.861 | 0.016 |
| 11.5 | 3 | 0.19604 | 1.769 | 0.491783 | 0.710 | 0.553 | 0.082 | Test 15 | -0.04619 | 0.06735 | -0.6607 | 3.51 | 271.3 | 0.859 | 7496 | 0.8589 | 0.1903 | 0.000952 | 0.1422 | -0.5337 | 57.62 | 0.952 | 7496 | 0.952 | 0.0877 | 0.0236 | 0.0424 | -0.04 | 2.0867 | 0.859 | 7496 | 0.859 | 0.017 |
| 9.5 | 3 | 0.19604 | 1.769 | 0.491783 | 0.664 | 0.540 | 0.085 | Test 16 | -0.00265 | 0.1781 | 0.6372 | 3.51 | 173.4 | 0.905 | 7496 | 0.9045 | 0.1521 | -0.00024 | 0.098 | 0.5312 | 123.7 | 0.899 | 7496 | 0.899 | 0.1284 | 0.0234 | -0.024 | 0.0561 | 2.2862 | 0.86 | 7496 | 0.86 | 0.018 |
| 5.5 | 3 | 0.19604 | 1.769 | 0.491783 | 0.680 | 0.540 | 0.090 | Test 17 | 0.03392 | 0.5675 | -0.3096 | 3.51 | 257.2 | 0.859 | 7496 | 0.8589 | 0.1852 | 0.04373 | 0.4794 | -0.1265 | 649.8 | 0.586 | 7496 | 0.586 | 0.2944 | 0.0228 | 0.0619 | 0.0261 | 2.554 | 0.869 | 7496 | 0.869 | 0.019 |
| 3.5 | 3 | 0.19604 | 1.769 | 0.491783 | 0.674 | 0.559 | 0.092 | Test 18 | 0.04672 | -0.3569 | -0.5163 | 3.51 | 192.1 | 0.885 | 7496 | 0.8849 | 0.1601 | 0.04327 | -0.2121 | -0.4705 | 515.3 | 0.66 | 7496 | 0.66 | 0.2622 | 0.0222 | 0.0169 | -0.068 | 2.6505 | 0.874 | 7496 | 0.874 | 0.019 |
| -0.5 | 3 | 0.19604 | 1.769 | 0.491783 | 0.568 | 0.442 | 0.098 | Test 19 | 0.04911 | -0.3415 | -0.3912 | 3.51 | 212.7 | 0.826 | 7496 | 0.8262 | 0.1684 | 0.01317 | -0.283 | -0.3217 | 678 | 0.504 | 7496 | 0.504 | 0.3007 | 0.022 | 0.0185 | -0.073 | 2.6463 | 0.891 | 7496 | 0.89 | 0.019 |
| -0.5 | 5 | 0.19604 | 1.769 | 0.491783 | 0.606 | 0.444 | 0.098 | Test 20 | 0.01384 | -0.2703 | -0.5272 | 3.51 | 160.9 | 0.891 | 7496 | 0.8911 | 0.1465 | -0.06884 | -0.03928 | -0.373 | 2125 | 0.199 | 7496 | 0.199 | 0.5324 | 0.0221 | 0.0206 | -0.073 | 2.6846 | 0.889 | 7496 | 0.889 | 0.019 |
| 5.5 | 5 | 0.19604 | 1.769 | 0.491783 | 0.650 | 0.523 | 0.090 | Test 21 | 0.01173 | -0.0965 | 0.6313 | 3.51 | 151.7 | 0.91 | 7496 | 0.9096 | 0.1423 | -0.01809 | -0.1743 | 0.4738 | 490.5 | 0.661 | 7496 | 0.661 | 0.2558 | 0.0229 | -0.053 | 0.0419 | 2.677 | 0.864 | 7496 | 0.864 | 0.019 |
| 9.5 | 5 | 0.19604 | 1.769 | 0.491783 | 0.664 | 0.567 | 0.084 | Test 22 | -0.03026 | -0.4821 | 0.4115 | 3.51 | 111.3 | 0.931 | 7496 | 0.9311 | 0.1219 | -0.02759 | -0.4136 | 0.3464 | 113.4 | 0.906 | 7496 | 0.906 | 0.123 | 0.0233 | -0.06 | 0.0094 | 2.3254 | 0.856 | 7496 | 0.856 | 0.018 |
| 11.5 | 5 | 0.19604 | 1.769 | 0.491783 | 0.666 | 0.562 | 0.081 | Test 23 | -0.03938 | -0.0076 | 0.6263 | 3.51 | 104.5 | 0.934 | 7496 | 0.9337 | 0.118 | -0.01463 | 0.04925 | 0.5449 | 71.69 | 0.94 | 7496 | 0.94 | 0.0978 | 0.0234 | -0.024 | 0.053 | 2.106 | 0.857 | 7496 | 0.857 | 0.017 |

| Location | Loading Parameters | | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **X** | **Y** | **Hm0** | **Tp** | **U0** | **R - Vx1** | **R - Vx2** | **R - WL** | **R037** | **a0** | **a1** | **b1** | **w** | **sse** | **rsq** | **dfe** | **adj** | **rms** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rms** | **a0** | **a1** | **b1** | **sse** | **rsq** | **dfe** | **adj** | **rms** |
| -0.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.346 | 0.379 | 0.117 | Test 1 | 0.05075 | 0.2616 | 0.1371 | 3.51 | 100.6 | 0.765 | 7496 | 0.7646 | 0.1158 | 0.09237 | 0.2701 | 0.0956 | 52.28 | 0.855 | 7496 | 0.855 | 0.0835 | -0.069 | 0.0088 | 0.047 | 0.5301 | 0.942 | 7496 | 0.942 | 0.008 |
| 1.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.415 | 0.416 | 0.116 | Test 2 | 0.05963 | 0.04071 | -0.3531 | 3.51 | 79.48 | 0.856 | 7496 | 0.8562 | 0.103 | 0.0811 | 0.01753 | -0.3343 | 48.61 | 0.896 | 7496 | 0.896 | 0.0805 | -0.069 | 0.0405 | -0.023 | 0.5416 | 0.937 | 7496 | 0.937 | 0.009 |
| 3.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.451 | 0.396 | 0.113 | Test 3 | 0.0578 | -0.346 | 0.1876 | 3.51 | 83.94 | 0.874 | 7496 | 0.8737 | 0.1058 | 0.03477 | -0.314 | 0.179 | 299.4 | 0.621 | 7496 | 0.621 | 0.1999 | -0.069 | -0.041 | -0.015 | 0.5596 | 0.928 | 7496 | 0.928 | 0.009 |
| 5.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.447 | 0.418 | 0.112 | Test 4 | 0.04276 | 0.3717 | 0.1589 | 3.51 | 70.14 | 0.897 | 7496 | 0.8973 | 0.0967 | -0.02057 | 0.3847 | 0.0992 | 1154 | 0.339 | 7496 | 0.339 | 0.3923 | -0.069 | 0.0123 | 0.0405 | 0.5788 | 0.921 | 7496 | 0.921 | 0.009 |
| 7.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.438 | 0.414 | 0.110 | Test 5 | 0.0239 | 0.4142 | -0.0154 | 3.51 | 281.5 | 0.696 | 7496 | 0.6959 | 0.1938 | 0.03438 | 0.3794 | 0.0017 | 110 | 0.831 | 7496 | 0.831 | 0.1212 | -0.069 | 0.0301 | 0.0267 | 0.596 | 0.91 | 7496 | 0.91 | 0.009 |
| 9.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.419 | 0.428 | 0.108 | Test 6 | 0.00636 | 0.00141 | 0.4127 | 3.51 | 444.8 | 0.59 | 7496 | 0.5894 | 0.2436 | -0.05088 | 0.04044 | 0.3754 | 572.7 | 0.483 | 7496 | 0.483 | 0.2764 | -0.07 | -0.027 | 0.0272 | 0.6108 | 0.9 | 7496 | 0.9 | 0.009 |
| 11.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.408 | 0.430 | 0.106 | Test 7 | 0.0002 | 0.3735 | 0.1633 | 3.51 | 69.82 | 0.899 | 7496 | 0.8992 | 0.0965 | 0.06154 | 0.3379 | 0.1463 | 741.1 | 0.407 | 7496 | 0.407 | 0.3144 | -0.07 | 0.0194 | 0.0308 | 0.6474 | 0.885 | 7496 | 0.885 | 0.009 |
| 13.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.395 | 0.374 | 0.104 | Test 8 | 0.00041 | 0.3884 | 0.0685 | 3.51 | 391.9 | 0.598 | 7496 | 0.5978 | 0.2286 | 0.01123 | 0.355 | 0.0742 | 484 | 0.505 | 7496 | 0.504 | 0.2541 | -0.07 | 0.0252 | 0.0237 | 0.6315 | 0.877 | 7496 | 0.877 | 0.009 |
| 15.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.419 | 0.428 | 0.102 | Test 9 | -0.01715 | 0.2718 | -0.2957 | 3.51 | 832.3 | 0.421 | 7496 | 0.4208 | 0.3332 | -0.04471 | 0.2604 | -0.281 | 1755 | 0.239 | 7496 | 0.239 | 0.4839 | -0.07 | 0.0314 | 0.009 | 0.6974 | 0.851 | 7496 | 0.851 | 0.01 |
| 17.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.412 | 0.366 | 0.100 | Test 10 | -0.01743 | -0.1129 | -0.3785 | 3.51 | 52.49 | 0.918 | 7496 | 0.9177 | 0.0837 | -0.03244 | -0.107 | -0.3162 | 1413 | 0.228 | 7496 | 0.228 | 0.4342 | -0.07 | 0.0068 | -0.03 | 0.7117 | 0.834 | 7496 | 0.834 | 0.01 |
| 25.5 | 1 | 0.09615 | 1.769 | 0.302018 | 0.390 | 0.353 | 0.094 | Test 11 | -0.02511 | -0.1661 | -0.3254 | 3.51 | 17.39 | 0.966 | 7496 | 0.9664 | 0.0482 | 0.004408 | -0.1586 | -0.3103 | 12.07 | 0.974 | 7496 | 0.974 | 0.0401 | -0.069 | 0.0037 | -0.025 | 0.7679 | 0.757 | 7496 | 0.757 | 0.01 |
| 25.5 | 3 | 0.09615 | 1.769 | 0.302018 | 0.409 | 0.358 | 0.094 | Test 12 | -0.04214 | -0.3565 | 0.08554 | 3.51 | 24.17 | 0.954 | 7496 | 0.9542 | 0.0568 | 0.001366 | -0.3478 | 0.0785 | 25.17 | 0.95 | 7496 | 0.95 | 0.0579 | -0.069 | -0.025 | -0.002 | 0.7697 | 0.757 | 7496 | 0.757 | 0.01 |
| 17.5 | 3 | 0.09615 | 1.769 | 0.302018 | 0.447 | 0.386 | 0.101 | Test 13 | -0.03538 | -0.2889 | 0.2935 | 3.51 | 27.52 | 0.959 | 7496 | 0.9585 | 0.0606 | 0.001272 | -0.2548 | 0.2888 | 18.65 | 0.968 | 7496 | 0.968 | 0.0499 | -0.07 | -0.029 | 0.0112 | 0.7335 | 0.83 | 7496 | 0.83 | 0.01 |
| 11.5 | 3 | 0.09615 | 1.769 | 0.302018 | 0.437 | 0.383 | 0.106 | Test 14 | -0.03639 | -0.4 | -0.0214 | 3.51 | 81.88 | 0.88 | 7496 | 0.8802 | 0.1045 | 0.005291 | -0.3773 | 0.0013 | 21.9 | 0.961 | 7496 | 0.961 | 0.054 | -0.07 | -0.029 | -0.022 | 0.6436 | 0.886 | 7496 | 0.886 | 0.009 |
| 9.5 | 3 | 0.09615 | 1.769 | 0.302018 | 0.425 | 0.372 | 0.108 | Test 15 | -0.02818 | -0.3174 | 0.2382 | 3.51 | 50.35 | 0.921 | 7496 | 0.9214 | 0.082 | -0.00028 | -0.28 | 0.2452 | 22.09 | 0.959 | 7496 | 0.959 | 0.0543 | -0.07 | -0.038 | 0.0003 | 0.6209 | 0.899 | 7496 | 0.898 | 0.009 |
| 5.5 | 3 | 0.09615 | 1.769 | 0.302018 | 0.392 | 0.376 | 0.112 | Test 16 | -0.00115 | -0.1808 | 0.3464 | 3.51 | 53.74 | 0.914 | 7496 | 0.9141 | 0.0847 | 0.01588 | -0.1472 | 0.3286 | 91.08 | 0.842 | 7496 | 0.842 | 0.1102 | -0.069 | -0.039 | 0.0156 | 0.5799 | 0.921 | 7496 | 0.921 | 0.009 |
| -0.5 | 3 | 0.09615 | 1.769 | 0.302018 | 0.390 | 0.358 | 0.117 | Test 17 | 0.03793 | -0.1521 | 0.3176 | 3.51 | 67.55 | 0.873 | 7496 | 0.8731 | 0.0949 | 0.02869 | -0.1153 | 0.3087 | 360.5 | 0.53 | 7496 | 0.53 | 0.2193 | -0.07 | -0.045 | 0.0136 | 0.5393 | 0.94 | 7496 | 0.94 | 0.009 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R038 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.390 | 0.341 | 0.102 | Test 1 | 0.05696 | -0.1076 | 0.3151 | 4.97 | 56.5 | 0.88 | 7496 | 0.8803 | 0.0868 | 0.06746 | -0.05183 | 0.2687 | 55.76 | 0.834 | 7496 | 0.834 | 0.0862 | -0.069 | -0.027 | 0.0185 | 0.302 | 0.931 | 7496 | 0.931 | 0.006 |
| 1.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.411 | 0.338 | 0.102 | Test 2 | 0.05528 | 0.1739 | -0.3099 | 4.96 | 58.63 | 0.89 | 7496 | 0.8898 | 0.0884 | 0.04213 | 0.1459 | -0.2571 | 25.8 | 0.927 | 7496 | 0.927 | 0.0587 | -0.069 | 0.0293 | -0.013 | 0.2815 | 0.932 | 7496 | 0.932 | 0.006 |
| 3.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.408 | 0.332 | 0.098 | Test 3 | 0.04498 | 0.171 | -0.3201 | 4.97 | 39.47 | 0.926 | 7496 | 0.926 | 0.0726 | 0.02346 | 0.133 | -0.278 | 73.97 | 0.828 | 7496 | 0.828 | 0.0993 | -0.069 | 0.0241 | -0.016 | 0.2658 | 0.923 | 7496 | 0.923 | 0.006 |
| 5.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.394 | 0.331 | 0.097 | Test 4 | 0.02701 | 0.2981 | -0.2139 | 4.97 | 37.16 | 0.931 | 7496 | 0.9314 | 0.0704 | 0.01768 | 0.245 | -0.1961 | 281 | 0.568 | 7496 | 0.568 | 0.1936 | -0.069 | 0.0261 | 0.0079 | 0.2864 | 0.907 | 7496 | 0.907 | 0.006 |
| 7.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.383 | 0.335 | 0.095 | Test 5 | 0.01408 | -0.2454 | -0.2753 | 4.97 | 56.87 | 0.9 | 7496 | 0.8997 | 0.0871 | 0.01643 | -0.2286 | -0.2223 | 81.33 | 0.824 | 7496 | 0.824 | 0.1042 | -0.069 | -0.013 | -0.022 | 0.2879 | 0.898 | 7496 | 0.897 | 0.006 |
| 9.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.361 | 0.319 | 0.094 | Test 6 | 0.0046 | 0.2817 | -0.2176 | 4.97 | 25.8 | 0.949 | 7496 | 0.9485 | 0.0587 | 0.002424 | 0.2417 | -0.2038 | 38.56 | 0.907 | 7496 | 0.907 | 0.0717 | -0.07 | 0.022 | -0.011 | 0.3482 | 0.865 | 7496 | 0.865 | 0.007 |
| 11.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.370 | 0.324 | 0.093 | Test 7 | -0.01914 | -0.0157 | 0.351 | 4.97 | 62.06 | 0.882 | 7496 | 0.8818 | 0.091 | 0.02146 | -0.01104 | 0.3023 | 621.1 | 0.356 | 7496 | 0.356 | 0.2879 | -0.07 | 0.0005 | 0.0233 | 0.2447 | 0.893 | 7496 | 0.893 | 0.006 |
| 13.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.365 | 0.334 | 0.093 | Test 8 | -0.01576 | 0.3488 | -0.0234 | 4.97 | 53.48 | 0.896 | 7496 | 0.8955 | 0.0845 | 0.01574 | 0.3165 | -0.0306 | 59.54 | 0.864 | 7496 | 0.864 | 0.0891 | -0.07 | 0.0226 | -0.003 | 0.1858 | 0.913 | 7496 | 0.913 | 0.005 |
| 15.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.363 | 0.328 | 0.093 | Test 9 | -0.01663 | 0.08364 | -0.3365 | 4.97 | 18.27 | 0.961 | 7496 | 0.961 | 0.0494 | 0.007158 | 0.04257 | -0.3178 | 181.9 | 0.679 | 7496 | 0.679 | 0.1558 | -0.07 | -0.001 | -0.023 | 0.1691 | 0.921 | 7496 | 0.921 | 0.00 |
| 17.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.355 | 0.319 | 0.093 | Test 10 | -0.01528 | 0.2363 | -0.2435 | 4.97 | 10.96 | 0.975 | 7496 | 0.9752 | 0.0382 | 0.007844 | 0.2011 | -0.2379 | 24.78 | 0.936 | 7496 | 0.936 | 0.0575 | -0.07 | 0.0075 | -0.022 | 0.1785 | 0.921 | 7496 | 0.921 | 0.00 |
| 25.5 | 1 | 0.10152 | 1.217 | 0.28772 | 0.285 | 0.271 | 0.098 | Test 11 | 0.00705 | -0.0608 | -0.2713 | 4.97 | 8.14 | 0.973 | 7496 | 0.9727 | 0.033 | 0.01269 | -0.06222 | -0.251 | 7.104 | 0.972 | 7496 | 0.972 | 0.0308 | -0.068 | -0.025 | -0.017 | 0.2122 | 0.941 | 7496 | 0.94 | 0.005 |
| 25.5 | 3 | 0.10152 | 1.217 | 0.28772 | 0.325 | 0.275 | 0.098 | Test 12 | -0.03504 | -0.2279 | 0.18 | 4.97 | 7.148 | 0.978 | 7496 | 0.9779 | 0.0309 | 0.002291 | -0.2112 | 0.1718 | 27.33 | 0.91 | 7496 | 0.91 | 0.0604 | -0.068 | 0.0075 | 0.029 | 0.2152 | 0.94 | 7496 | 0.94 | 0.005 |
| 17.5 | 3 | 0.10152 | 1.217 | 0.28772 | 0.371 | 0.324 | 0.093 | Test 13 | -0.0216 | 0.2056 | -0.283 | 4.97 | 14.75 | 0.969 | 7496 | 0.9688 | 0.0444 | 0.001461 | 0.1851 | -0.2642 | 13.24 | 0.967 | 7496 | 0.967 | 0.042 | -0.07 | 0.0058 | -0.023 | 0.1738 | 0.923 | 7496 | 0.923 | 0.00 |
| 11.5 | 3 | 0.10152 | 1.217 | 0.28772 | 0.400 | 0.337 | 0.094 | Test 14 | -0.04023 | 0.2082 | 0.2929 | 4.97 | 36.1 | 0.931 | 7496 | 0.9306 | 0.0694 | 0.004347 | 0.1957 | 0.2695 | 14.76 | 0.966 | 7496 | 0.966 | 0.0444 | -0.07 | 0.0137 | 0.0192 | 0.214 | 0.907 | 7496 | 0.907 | 0.005 |
| 9.5 | 3 | 0.10152 | 1.217 | 0.28772 | 0.379 | 0.336 | 0.094 | Test 15 | -0.02794 | 0.1264 | 0.3272 | 4.97 | 24.49 | 0.95 | 7496 | 0.9496 | 0.0572 | 0.003949 | 0.1389 | 0.3012 | 27.25 | 0.938 | 7496 | 0.938 | 0.0603 | -0.07 | 0.0056 | 0.0237 | 0.3388 | 0.868 | 7496 | 0.868 | 0.007 |
| 5.5 | 3 | 0.10152 | 1.217 | 0.28772 | 0.354 | 0.329 | 0.097 | Test 16 | -0.01675 | -0.1974 | -0.2732 | 4.96 | 14.21 | 0.968 | 7496 | 0.9677 | 0.0435 | 0.006971 | -0.1923 | -0.258 | 25.91 | 0.937 | 7496 | 0.937 | 0.0588 | -0.07 | 0.0056 | -0.027 | 0.2938 | 0.904 | 7496 | 0.904 | 0.006 |
| -0.5 | 3 | 0.10152 | 1.217 | 0.28772 | 0.368 | 0.331 | 0.103 | Test 17 | 0.04792 | -0.2602 | -0.1866 | 4.97 | 40.08 | 0.906 | 7496 | 0.9056 | 0.0731 | 0.02382 | -0.2717 | -0.1433 | 54.9 | 0.866 | 7496 | 0.866 | 0.0856 | -0.07 | -0.012 | -0.031 | 0.2682 | 0.939 | 7496 | 0.939 | 0.006 |

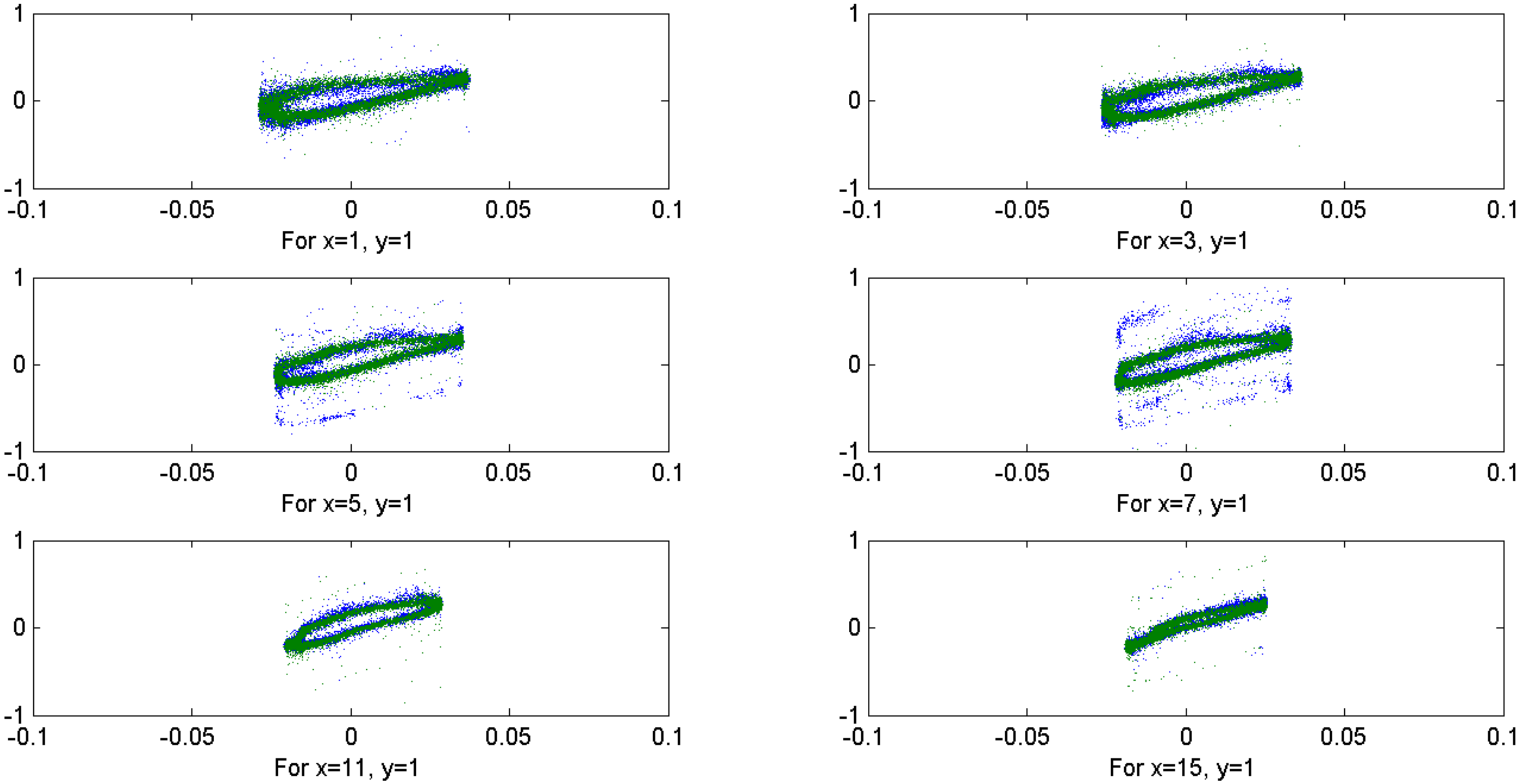
| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R039 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.272 | 0.299 | 0.094 | Test 1 | 0.00959 | 0.1907 | -0.1807 | 5.72 | 641.3 | 0.288 | 7496 | 0.2873 | 0.2925 | 0.08632 | 0.1513 | -0.1501 | 445.4 | 0.277 | 7496 | 0.276 | 0.2437 | -0.072 | 0.0168 | -0.014 | 19.29 | 0.083 | 7496 | 0.083 | 0.051 |
| 1.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.293 | 0.312 | 0.094 | Test 2 | 0.00909 | 0.06164 | -0.277 | 5.72 | 681.6 | 0.307 | 7496 | 0.3068 | 0.3015 | 0.06651 | 0.06562 | -0.2369 | 682.1 | 0.249 | 7496 | 0.249 | 0.3016 | -0.072 | 0.0085 | -0.02 | 18.7 | 0.088 | 7496 | 0.087 | 0.05 |
| 3.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.304 | 0.302 | 0.094 | Test 3 | -0.00171 | -0.1993 | -0.2269 | 5.72 | 921.7 | 0.271 | 7496 | 0.2703 | 0.3507 | 0.0552 | -0.1384 | -0.2047 | 813.2 | 0.22 | 7496 | 0.219 | 0.3294 | -0.073 | -0.014 | -0.016 | 18.059 | 0.085 | 7496 | 0.085 | 0.049 |
| 5.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.333 | 0.288 | 0.094 | Test 4 | 0.00392 | -0.1101 | -0.3096 | 5.72 | 1161 | 0.259 | 7496 | 0.2583 | 0.3936 | 0.04122 | -0.0656 | -0.2375 | 944.2 | 0.194 | 7496 | 0.194 | 0.3549 | -0.073 | 0.0084 | -0.02 | 17.535 | 0.089 | 7496 | 0.088 | 0.048 |
| 7.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.351 | 0.267 | 0.095 | Test 5 | -0.00918 | 0.202 | 0.2757 | 5.72 | 1270 | 0.256 | 7496 | 0.2561 | 0.4116 | 0.02175 | 0.1301 | 0.2083 | 974.9 | 0.188 | 7496 | 0.188 | 0.3606 | -0.073 | 0.0153 | 0.0153 | 16.729 | 0.095 | 7496 | 0.094 | 0.047 |
| 9.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.328 | 0.245 | 0.096 | Test 6 | -0.06003 | 0.2028 | 0.1755 | 5.72 | 1367 | 0.165 | 7496 | 0.1645 | 0.427 | 0.007128 | 0.2005 | 0.1276 | 1021 | 0.172 | 7496 | 0.172 | 0.3691 | -0.073 | 0.0219 | 0.0052 | 15.802 | 0.107 | 7496 | 0.107 | 0.046 |
| 11.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.338 | 0.230 | 0.097 | Test 7 | -0.06704 | -0.2434 | -0.1197 | 5.72 | 1372 | 0.168 | 7496 | 0.1671 | 0.4278 | -0.00074 | -0.2233 | -0.0524 | 1072 | 0.156 | 7496 | 0.155 | 0.3781 | -0.073 | -0.023 | 0.0022 | 14.746 | 0.122 | 7496 | 0.121 | 0.044 |
| 13.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.335 | 0.230 | 0.097 | Test 8 | -0.06248 | 0.1094 | 0.2491 | 5.72 | 1386 | 0.167 | 7496 | 0.1665 | 0.43 | -0.00882 | 0.1264 | 0.1818 | 1069 | 0.147 | 7496 | 0.146 | 0.3777 | -0.073 | 0.0203 | 0.0128 | 13.893 | 0.134 | 7496 | 0.134 | 0.043 |
| 15.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.327 | 0.222 | 0.098 | Test 9 | -0.06457 | 0.2221 | 0.1396 | 5.72 | 1353 | 0.16 | 7496 | 0.1598 | 0.4248 | -0.03707 | 0.1734 | 0.0642 | 1188 | 0.097 | 7496 | 0.097 | 0.3981 | -0.073 | 0.0251 | 0.002 | 13.143 | 0.154 | 7496 | 0.153 | 0.042 |
| 17.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.307 | 0.226 | 0.100 | Test 10 | -0.06318 | -0.2429 | 0.02386 | 5.72 | 1297 | 0.147 | 7496 | 0.1465 | 0.416 | -0.02637 | -0.1942 | 0.045 | 1052 | 0.124 | 7496 | 0.124 | 0.3747 | -0.073 | -0.023 | 0.0141 | 12.483 | 0.178 | 7496 | 0.178 | 0.041 |
| 25.5 | 1 | 0.15958 | 2.120 | 0.512201 | 0.251 | 0.200 | 0.103 | Test 11 | -0.06263 | -0.1873 | 0.02125 | 5.72 | 919.3 | 0.127 | 7496 | 0.1263 | 0.3502 | -0.03716 | -0.1619 | 0.0166 | 847.6 | 0.105 | 7496 | 0.105 | 0.3363 | -0.071 | -0.028 | 0.0163 | 9.8797 | 0.28 | 7496 | 0.28 | 0.036 |

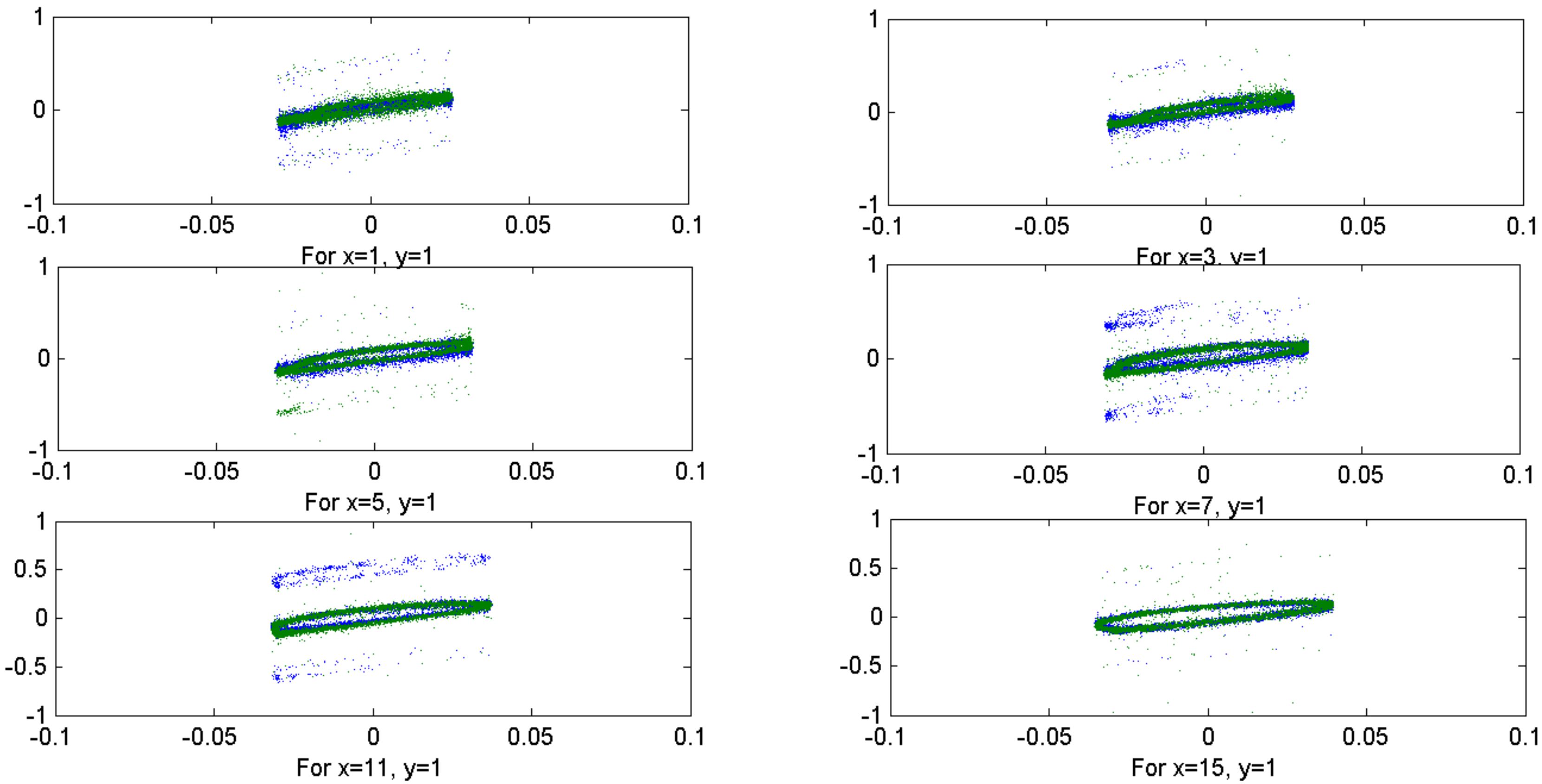
| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R040 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.336 | 0.413 | 0.139 | Test 1 | -0.01329 | -0.2721 | -0.1741 | 3.31 | 380.4 | 0.507 | 7496 | 0.5069 | 0.2253 | 0.08717 | -0.2785 | -0.1687 | 209.5 | 0.655 | 7496 | 0.655 | 0.1672 | -0.072 | 0.0021 | -0.067 | 2.3485 | 0.878 | 7496 | 0.878 | 0.018 |
| 1.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.424 | 0.537 | 0.137 | Test 2 | 0.00935 | 0.1938 | 0.3667 | 3.31 | 342 | 0.654 | 7496 | 0.6534 | 0.2136 | 0.08859 | 0.2428 | 0.3775 | 165 | 0.821 | 7496 | 0.821 | 0.1484 | -0.072 | -0.029 | 0.0582 | 2.3536 | 0.87 | 7496 | 0.87 | 0.018 |
| 3.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.507 | 0.548 | 0.135 | Test 3 | 0.01876 | 0.4857 | 0.05153 | 3.31 | 361.8 | 0.712 | 7496 | 0.7119 | 0.2197 | 0.05744 | 0.4874 | 0.0586 | 237.5 | 0.792 | 7496 | 0.792 | 0.178 | -0.072 | 0.0306 | 0.0543 | 2.3579 | 0.861 | 7496 | 0.861 | 0.018 |
| 5.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.556 | 0.575 | 0.133 | Test 4 | 0.01272 | -0.0729 | -0.5386 | 3.31 | 382.3 | 0.743 | 7496 | 0.7433 | 0.2258 | 0.05155 | -0.05639 | -0.5202 | 653.9 | 0.611 | 7496 | 0.611 | 0.2953 | -0.073 | 0.0419 | -0.043 | 2.4149 | 0.849 | 7496 | 0.849 | 0.018 |
| 7.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.592 | 0.572 | 0.132 | Test 5 | 0.00048 | -0.2845 | -0.5181 | 3.31 | 384.8 | 0.773 | 7496 | 0.7729 | 0.2266 | 0.03645 | -0.2904 | -0.4497 | 792.4 | 0.576 | 7496 | 0.575 | 0.3251 | -0.073 | 0.0191 | -0.055 | 2.5831 | 0.831 | 7496 | 0.831 | 0.019 |
| 9.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.597 | 0.567 | 0.130 | Test 6 | -0.05606 | -0.492 | -0.226 | 3.31 | 617.7 | 0.64 | 7496 | 0.6401 | 0.2871 | 0.02074 | -0.5104 | -0.1939 | 720.3 | 0.608 | 7496 | 0.608 | 0.31 | -0.074 | -0.018 | -0.053 | 2.7342 | 0.812 | 7496 | 0.812 | 0.019 |
| 11.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.628 | 0.570 | 0.127 | Test 7 | -0.06175 | 0.5563 | 0.1034 | 3.31 | 555.3 | 0.684 | 7496 | 0.6836 | 0.2722 | 0.008948 | 0.5565 | 0.0707 | 457.4 | 0.721 | 7496 | 0.721 | 0.247 | -0.074 | 0.0346 | 0.0408 | 2.8496 | 0.79 | 7496 | 0.79 | 0.02 |
| 13.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.644 | 0.568 | 0.124 | Test 8 | -0.05627 | 0.2544 | 0.5298 | 3.31 | 476 | 0.731 | 7496 | 0.7311 | 0.252 | 0.008542 | 0.2636 | 0.4937 | 176.1 | 0.87 | 7496 | 0.87 | 0.1533 | -0.073 | 0.0099 | 0.05 | 2.9513 | 0.768 | 7496 | 0.768 | 0.02 |
| 15.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.655 | 0.574 | 0.122 | Test 9 | -0.06404 | -0.1567 | 0.5696 | 3.31 | 414 | 0.76 | 7496 | 0.7596 | 0.235 | -0.02775 | -0.1364 | 0.5292 | 315.7 | 0.78 | 7496 | 0.78 | 0.2052 | -0.073 | -0.038 | 0.0303 | 3.0699 | 0.745 | 7496 | 0.745 | 0.02 |
| 17.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.657 | 0.577 | 0.120 | Test 10 | -0.06957 | 0.08463 | -0.5818 | 3.31 | 317.8 | 0.803 | 7496 | 0.803 | 0.2059 | -0.03775 | 0.09152 | -0.5317 | 123.5 | 0.898 | 7496 | 0.898 | 0.1284 | -0.073 | 0.0294 | -0.037 | 3.1808 | 0.723 | 7496 | 0.723 | 0.021 |
| 25.5 | 1 | 0.15 | 1.898 | 0.475747 | 0.596 | 0.511 | 0.112 | Test 11 | -0.08812 | -0.5077 | 0.00337 | 3.31 | 130.7 | 0.881 | 7496 | 0.8808 | 0.1321 | -0.02161 | -0.4887 | 0.0318 | 187.1 | 0.828 | 7496 | 0.828 | 0.158 | -0.072 | -0.037 | -0.014 | 3.4589 | 0.627 | 7496 | 0.627 | 0.022 |

| X | Y | Hm0 | Tp | U0 | R - Vx1 | R - Vx2 | R - WL | R041 | a0 | a1 | b1 | w | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms | a0 | a1 | b1 | sse | rsq | dfe | adj | rms |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -0.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.394 | 0.427 | 0.130 | Test 1 | 0.00334 | 0.00863 | 0.3904 | 4.05 | 286.4 | 0.666 | 7496 | 0.6662 | 0.1955 | 0.1013 | 0.03871 | 0.323 | 127.8 | 0.756 | 7496 | 0.756 | 0.1306 | -0.073 | -0.045 | 0.0342 | 2.1803 | 0.847 | 7496 | 0.847 | 0.017 |

| Location | Loading Parameters | | | | Resultant Max. | | | Test | Coefficient for Vx1 | | | | Goodness of fit parameters | | | | | Coefficient for Vx2 | | | Goodness of fit parameters | | | | | Coefficient for WL | | | Goodness of fit parameters | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.504 | 0.555 | 0.128 | Test 2 | 0.02083 | -0.0686 | 0.4781 | 4.05 | 280.6 | 0.757 | 7496 | 0.7571 | 0.1935 | 0.1035 | 0.000966 | 0.4519 | 121.8 | 0.863 | 7496 | 0.863 | 0.1275 | -0.073 | -0.045 | 0.0326 | 2.0429 | 0.848 | 7496 | 0.848 | 0.017 |
| 3.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.580 | 0.579 | 0.127 | Test 3 | 0.03539 | 0.243 | 0.4875 | 4.05 | 244.1 | 0.82 | 7496 | 0.8201 | 0.1804 | 0.06738 | 0.2564 | 0.4424 | 153.5 | 0.865 | 7496 | 0.865 | 0.1431 | -0.074 | -0.01 | 0.0524 | 2.1062 | 0.835 | 7496 | 0.835 | 0.017 |
| 5.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.625 | 0.612 | 0.124 | Test 4 | 0.03311 | 0.2295 | 0.5454 | 4.05 | 268.9 | 0.83 | 7496 | 0.83 | 0.1894 | 0.06707 | 0.2133 | 0.5011 | 411.1 | 0.73 | 7496 | 0.73 | 0.2342 | -0.074 | -0.014 | 0.0484 | 2.3126 | 0.804 | 7496 | 0.804 | 0.018 |
| 7.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.655 | 0.580 | 0.121 | Test 5 | 0.02552 | 0.4896 | 0.3964 | 4.05 | 221.3 | 0.871 | 7496 | 0.8705 | 0.1718 | 0.02567 | 0.4197 | 0.3614 | 129 | 0.899 | 7496 | 0.899 | 0.1312 | -0.074 | 0.0083 | 0.0465 | 2.375 | 0.779 | 7496 | 0.779 | 0.018 |
| 9.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.632 | 0.552 | 0.118 | Test 6 | -0.00672 | -0.2072 | 0.5895 | 4.05 | 287.1 | 0.836 | 7496 | 0.836 | 0.1957 | 0.004968 | -0.1746 | 0.5183 | 144.3 | 0.886 | 7496 | 0.886 | 0.1387 | -0.074 | -0.035 | 0.0272 | 2.3862 | 0.752 | 7496 | 0.752 | 0.018 |
| 11.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.652 | 0.553 | 0.116 | Test 7 | -0.01756 | -0.4803 | 0.4151 | 4.05 | 181.5 | 0.893 | 7496 | 0.8927 | 0.1556 | 0.007671 | -0.4108 | 0.3588 | 242.3 | 0.822 | 7496 | 0.822 | 0.1798 | -0.074 | -0.041 | 0.0074 | 2.398 | 0.733 | 7496 | 0.733 | 0.018 |
| 13.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.652 | 0.548 | 0.114 | Test 8 | -0.04059 | 0.227 | 0.5677 | 4.05 | 251.5 | 0.848 | 7496 | 0.8478 | 0.1832 | -0.00891 | 0.2014 | 0.4998 | 123.7 | 0.898 | 7496 | 0.898 | 0.1285 | -0.074 | 0.0026 | 0.0401 | 2.4429 | 0.713 | 7496 | 0.713 | 0.018 |
| 13 | 1 | 0.15159 | 1.549 | 0.464677 | 0.651 | 0.543 | 0.112 | Test 9 | -0.05095 | -0.0653 | -0.5963 | 4.05 | 292.5 | 0.822 | 7496 | 0.8217 | 0.1975 | -0.03885 | -0.0559 | -0.5014 | 537.6 | 0.64 | 7496 | 0.64 | 0.2678 | -0.073 | 0.0055 | -0.039 | 2.5037 | 0.695 | 7496 | 0.695 | 0.018 |
| 17.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.645 | 0.543 | 0.111 | Test 10 | -0.06786 | 0.175 | 0.5504 | 4.05 | 122.5 | 0.911 | 7496 | 0.9107 | 0.1279 | -0.02945 | 0.1614 | 0.4875 | 108.4 | 0.901 | 7496 | 0.901 | 0.1203 | -0.073 | 0.0034 | 0.0379 | 2.5085 | 0.684 | 7496 | 0.684 | 0.018 |
| 25.5 | 1 | 0.15159 | 1.549 | 0.464677 | 0.559 | 0.455 | 0.106 | Test 11 | -0.06783 | 0.3205 | 0.3718 | 4.05 | 75.02 | 0.923 | 7496 | 0.9233 | 0.1 | 0.03363 | 0.2868 | 0.3085 | 557.8 | 0.544 | 7496 | 0.544 | 0.2728 | -0.073 | 0.026 | 0.0207 | 1.7658 | 0.701 | 7496 | 0.701 | 0.015 |

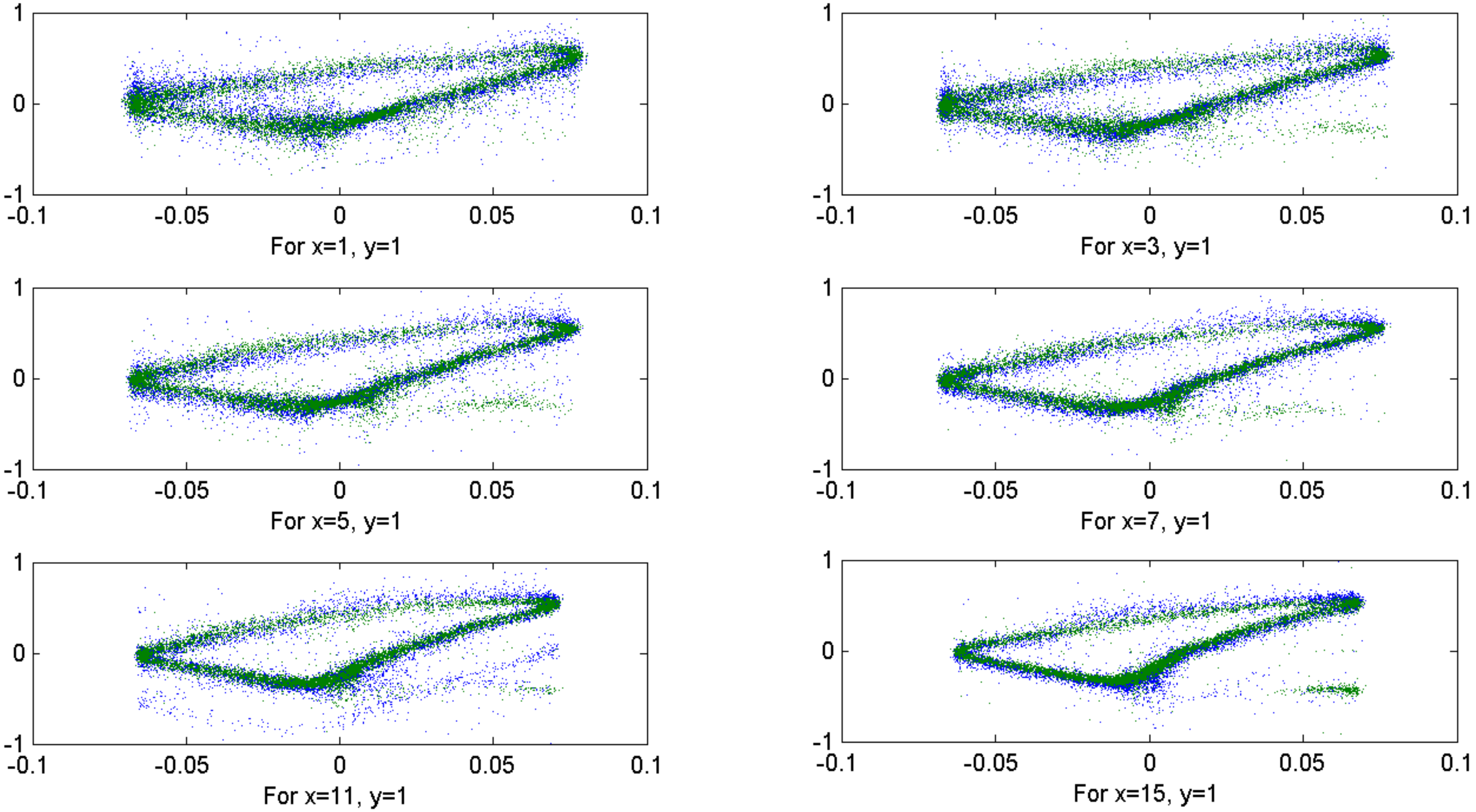
Experiment R001, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



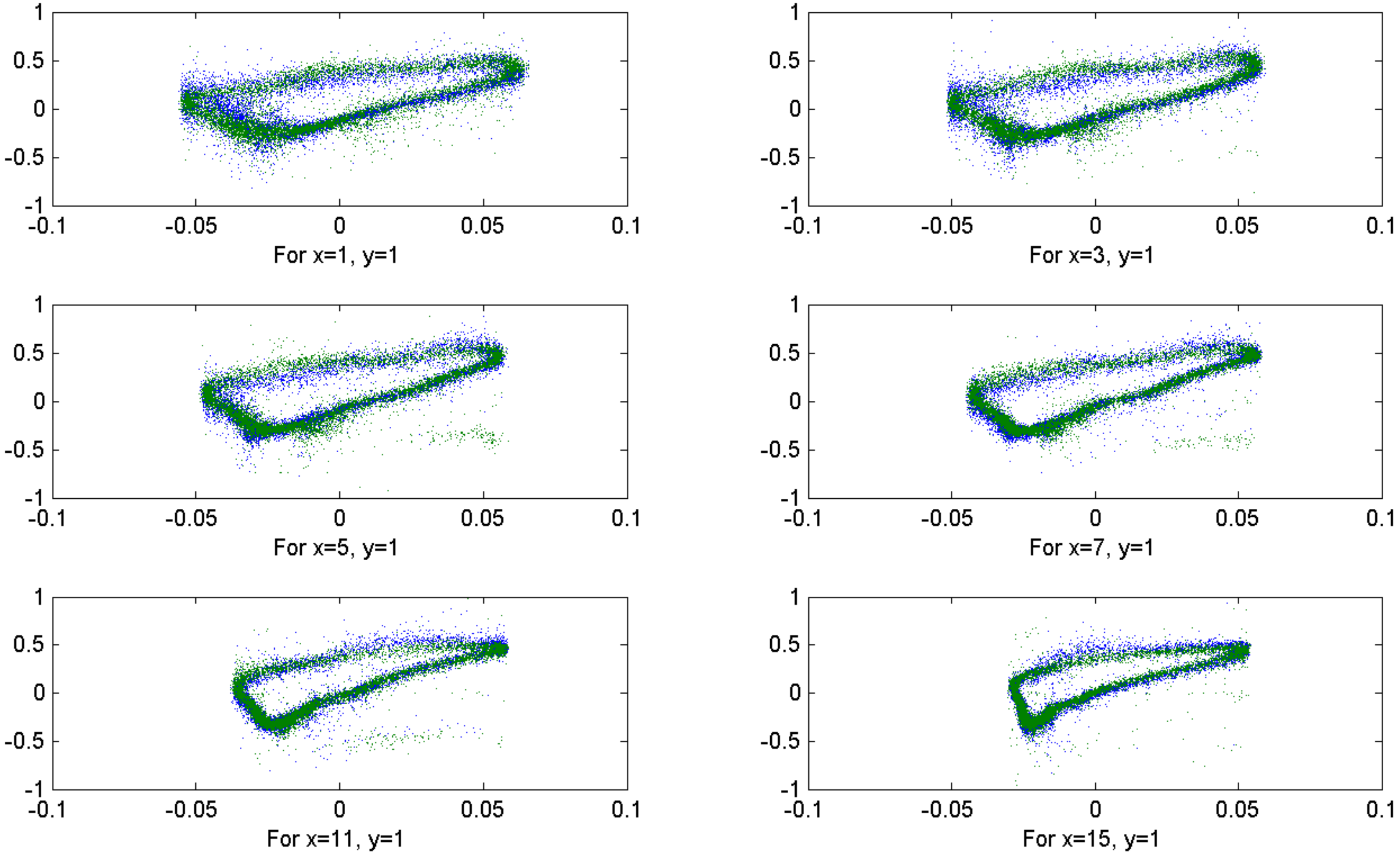


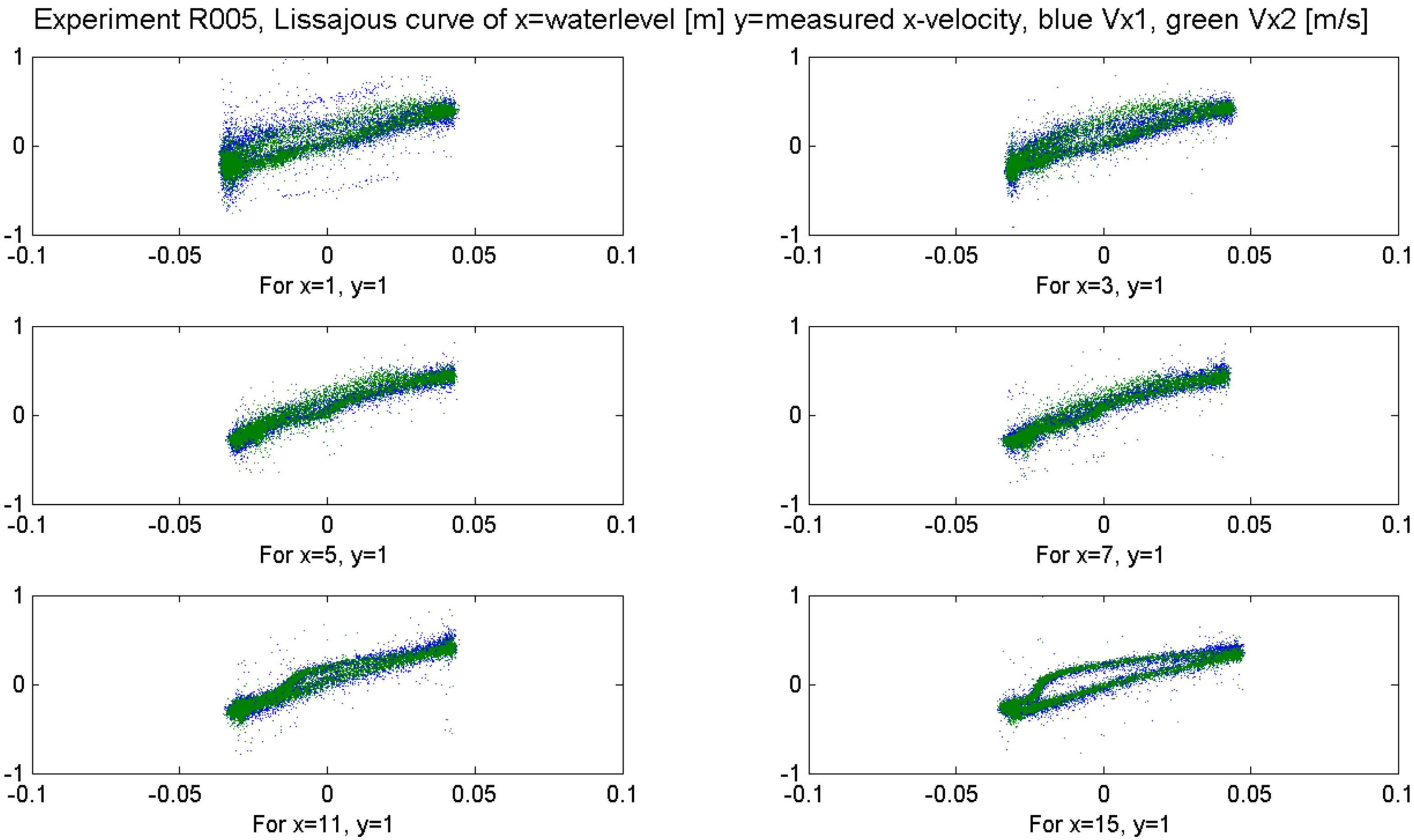
Experiment R002, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

Experiment R003, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



Experiment R004, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]





Experiment R005, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

For x=1, y=1

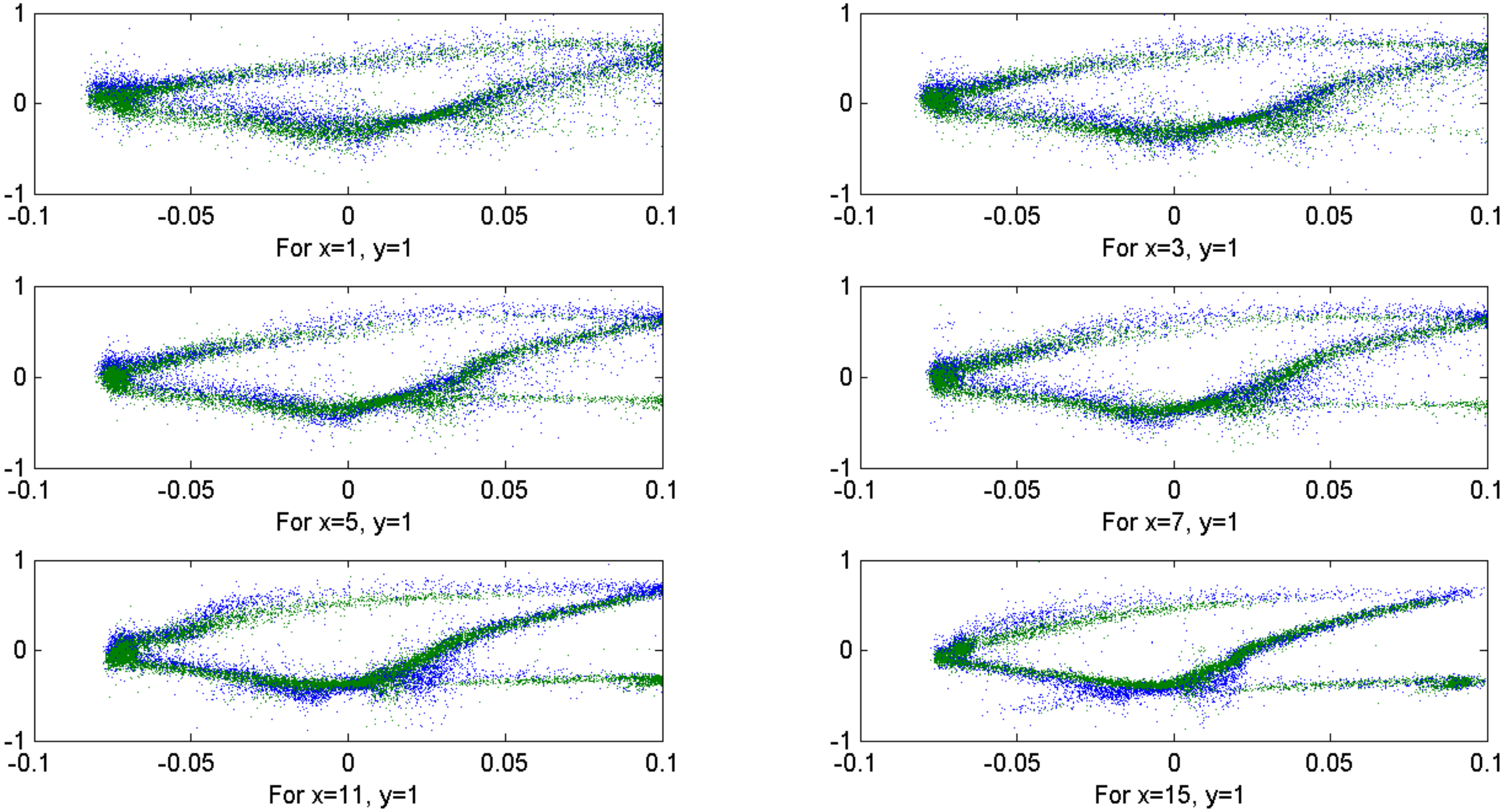
For x=3, y=1

For x=5, y=1

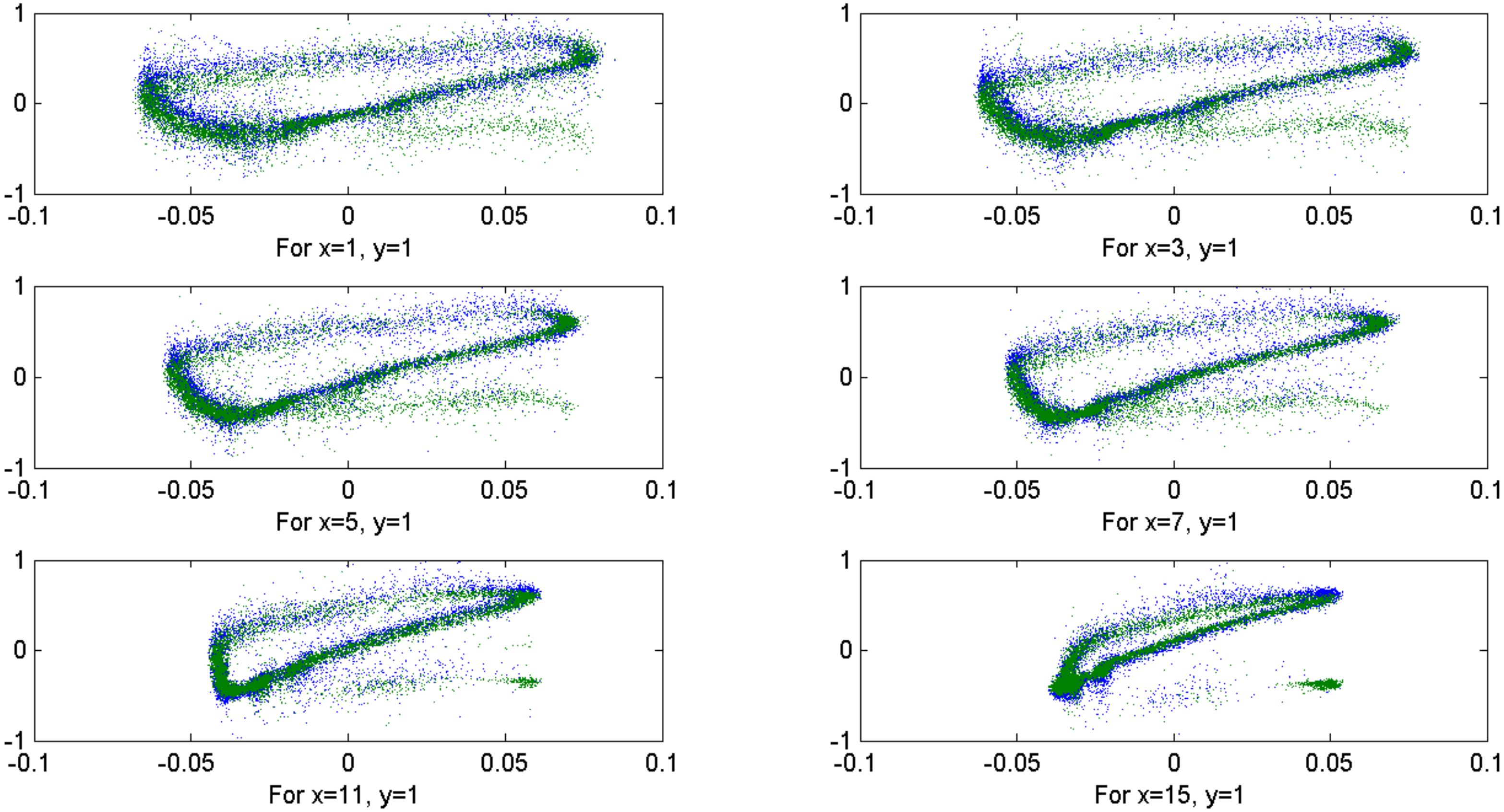
For x=7, y=1

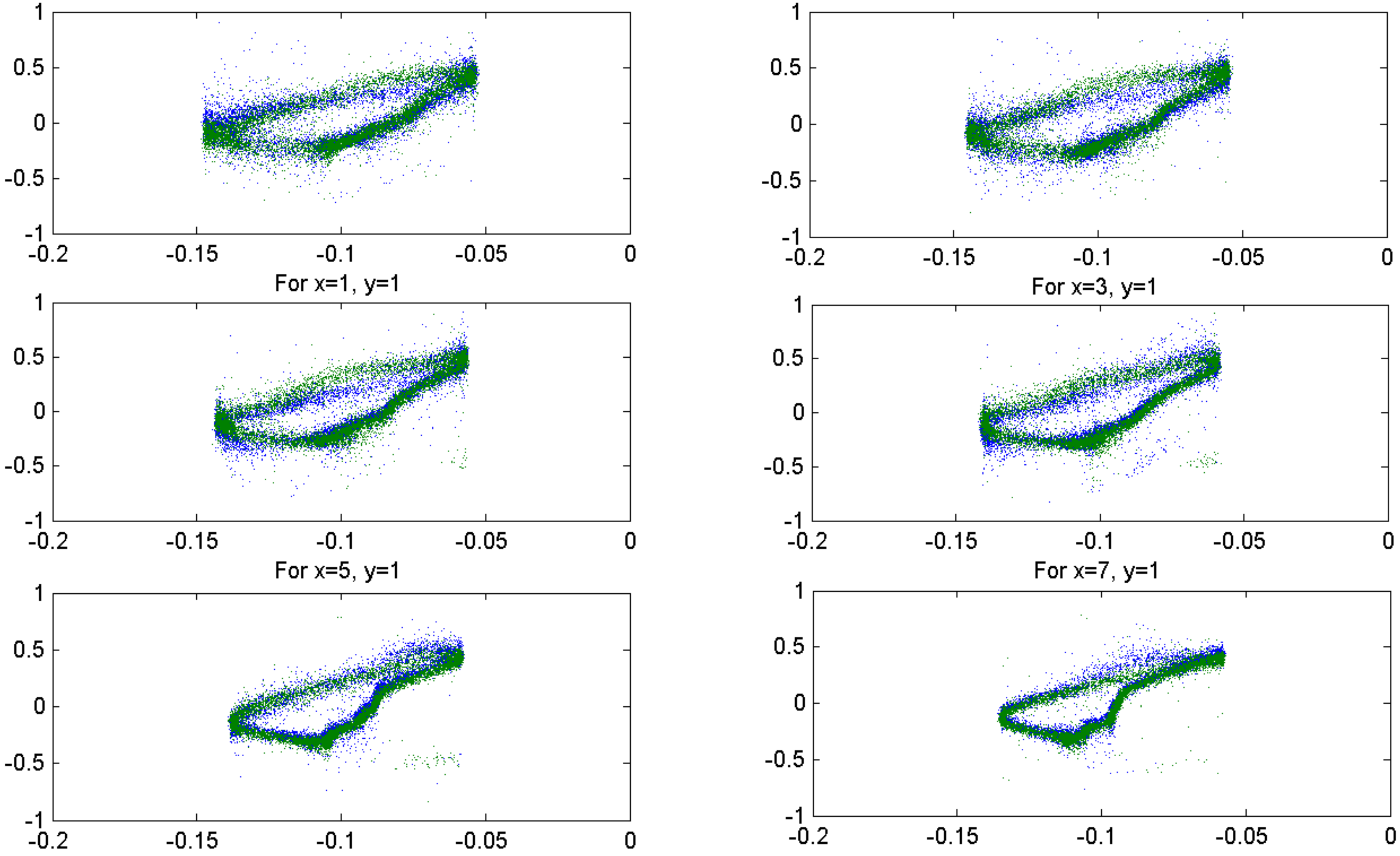
For x=11, y=1

For x=15, y=1


Experiment R006, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

Experiment R007, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]





Experiment R008, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

For x=1, y=1

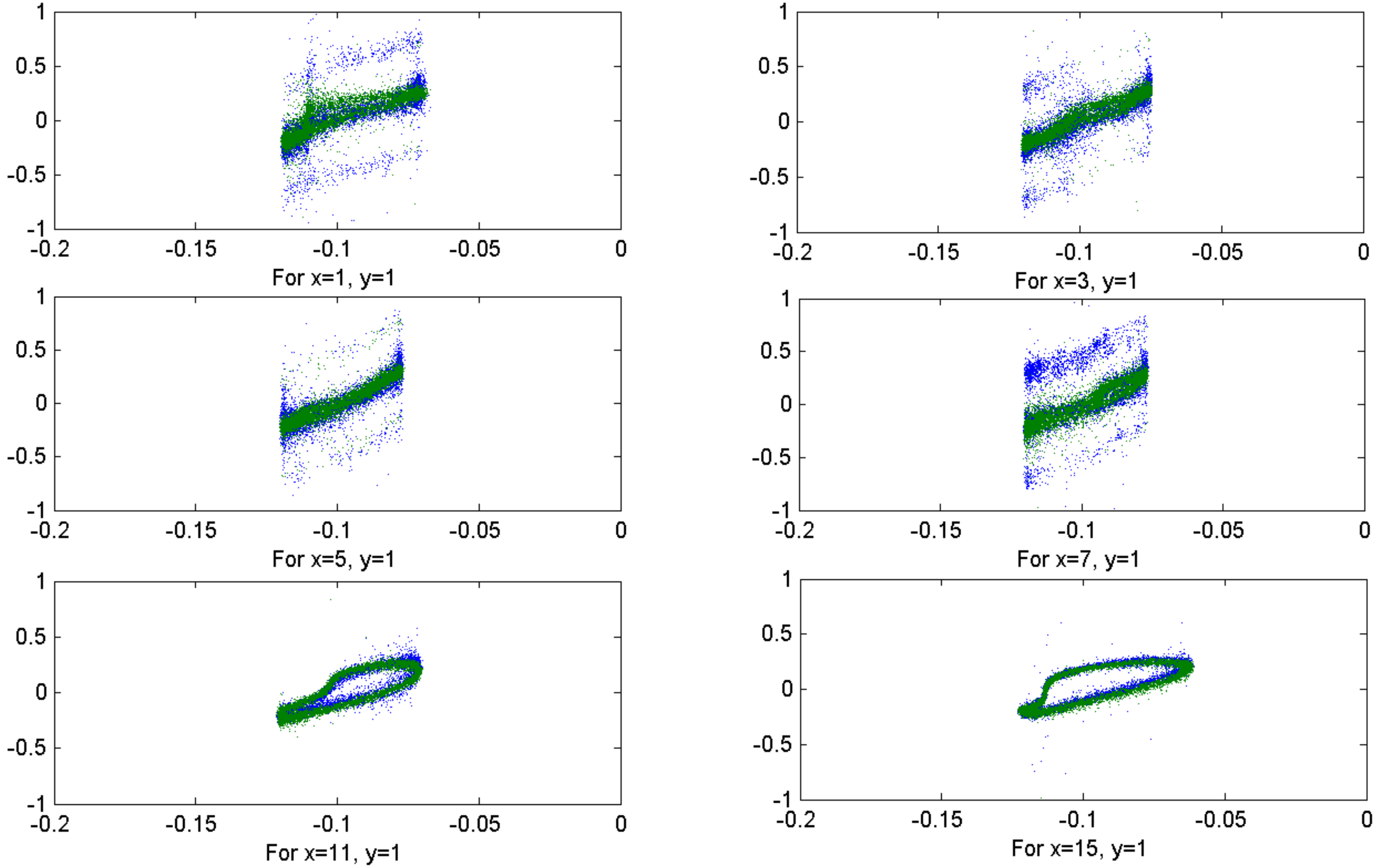
For x=3, y=1

For x=5, y=1

For x=7, y=1

For x=11, y=1

For x=15, y=1



Experiment R009, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

For x=1, y=1

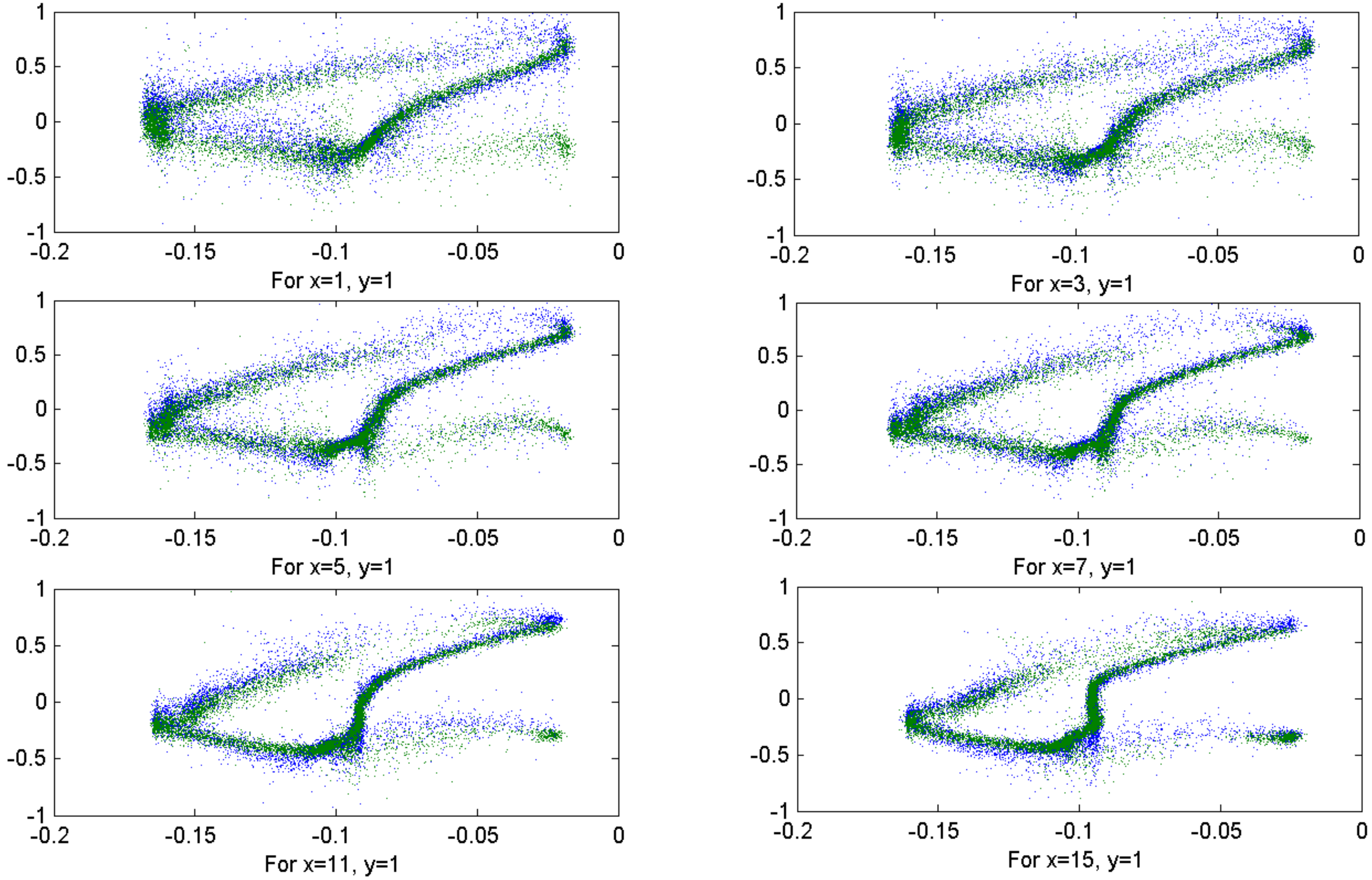
For x=3, y=1

For x=5, y=1

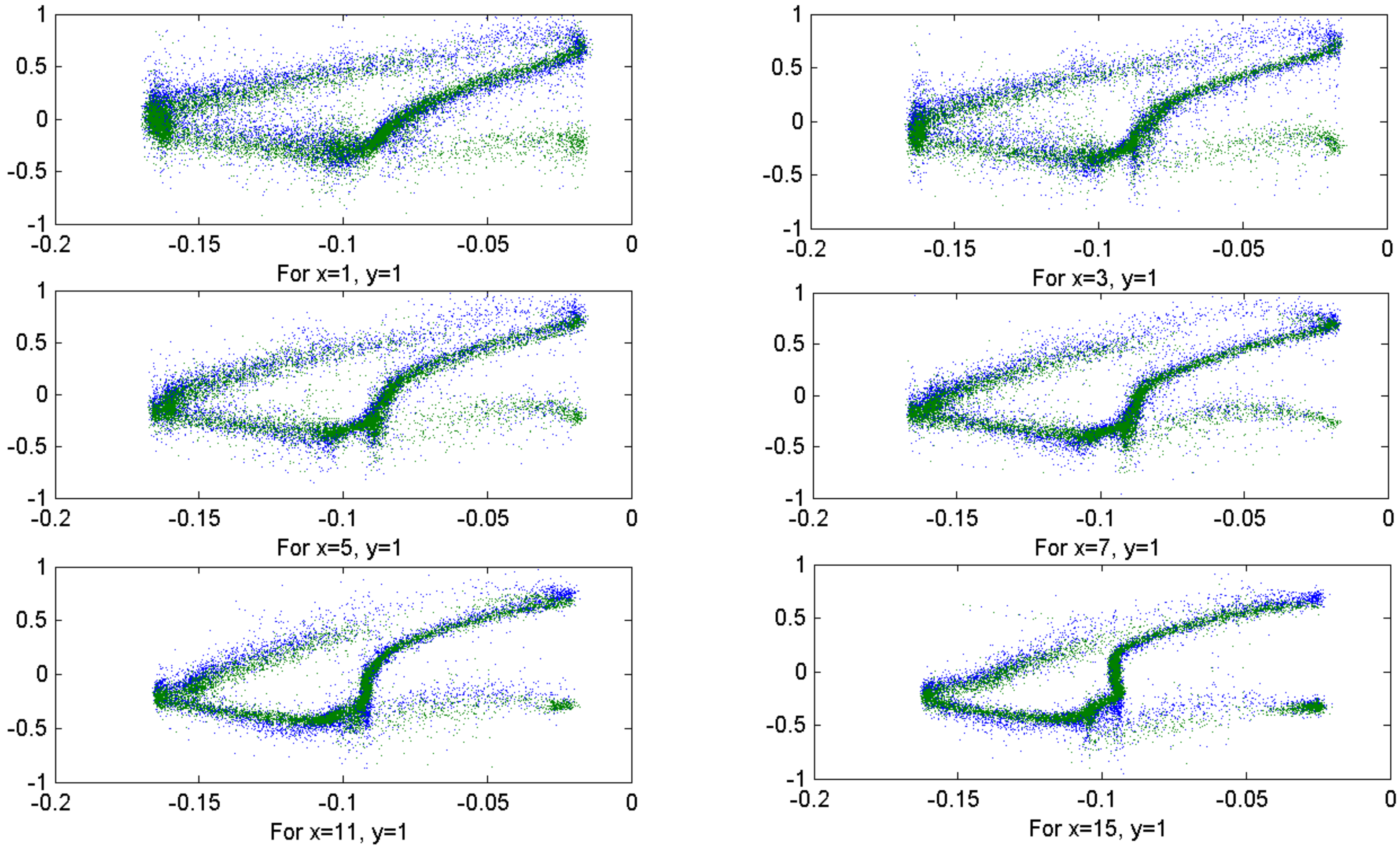
For x=7, y=1

For x=11, y=1

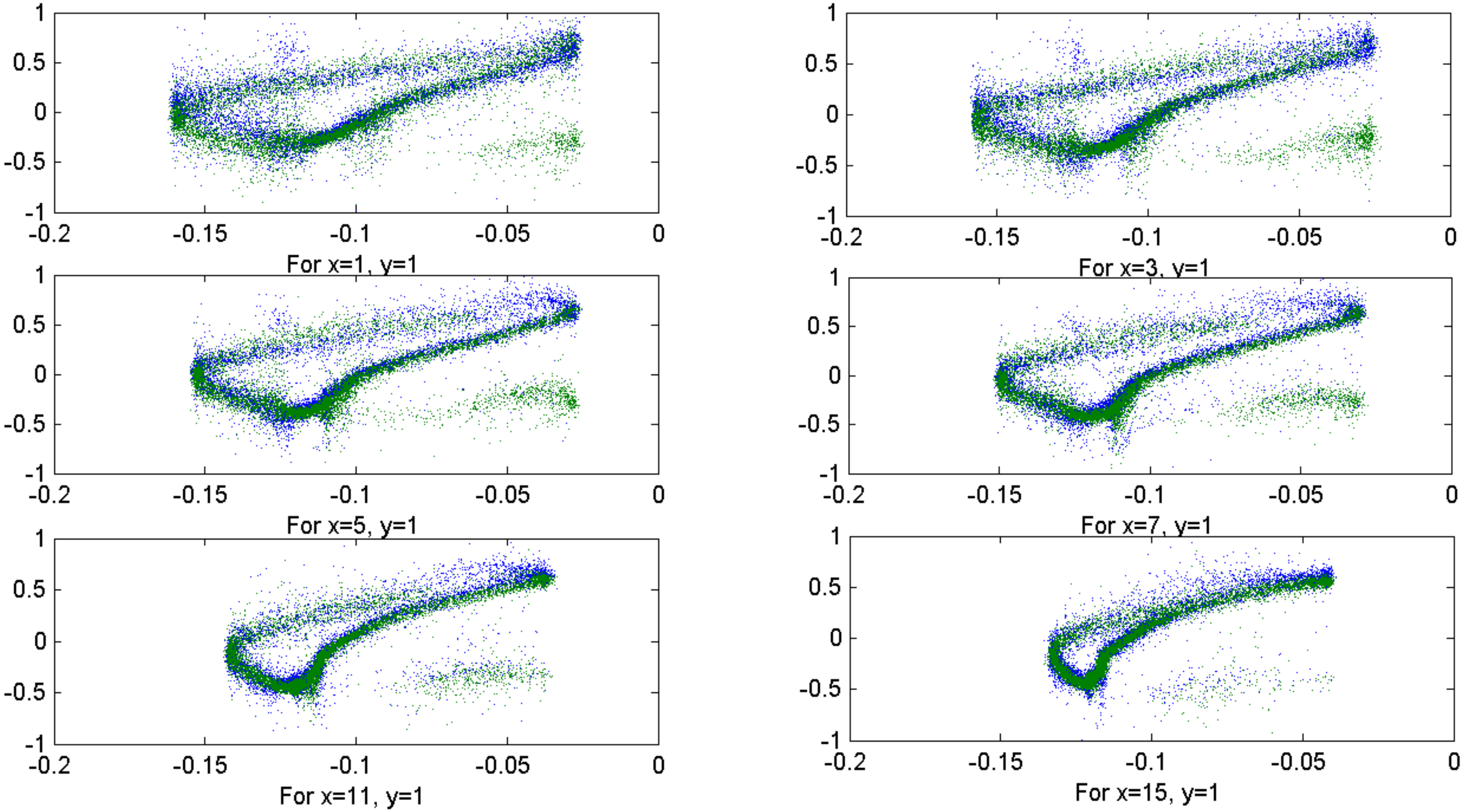
For x=15, y=1



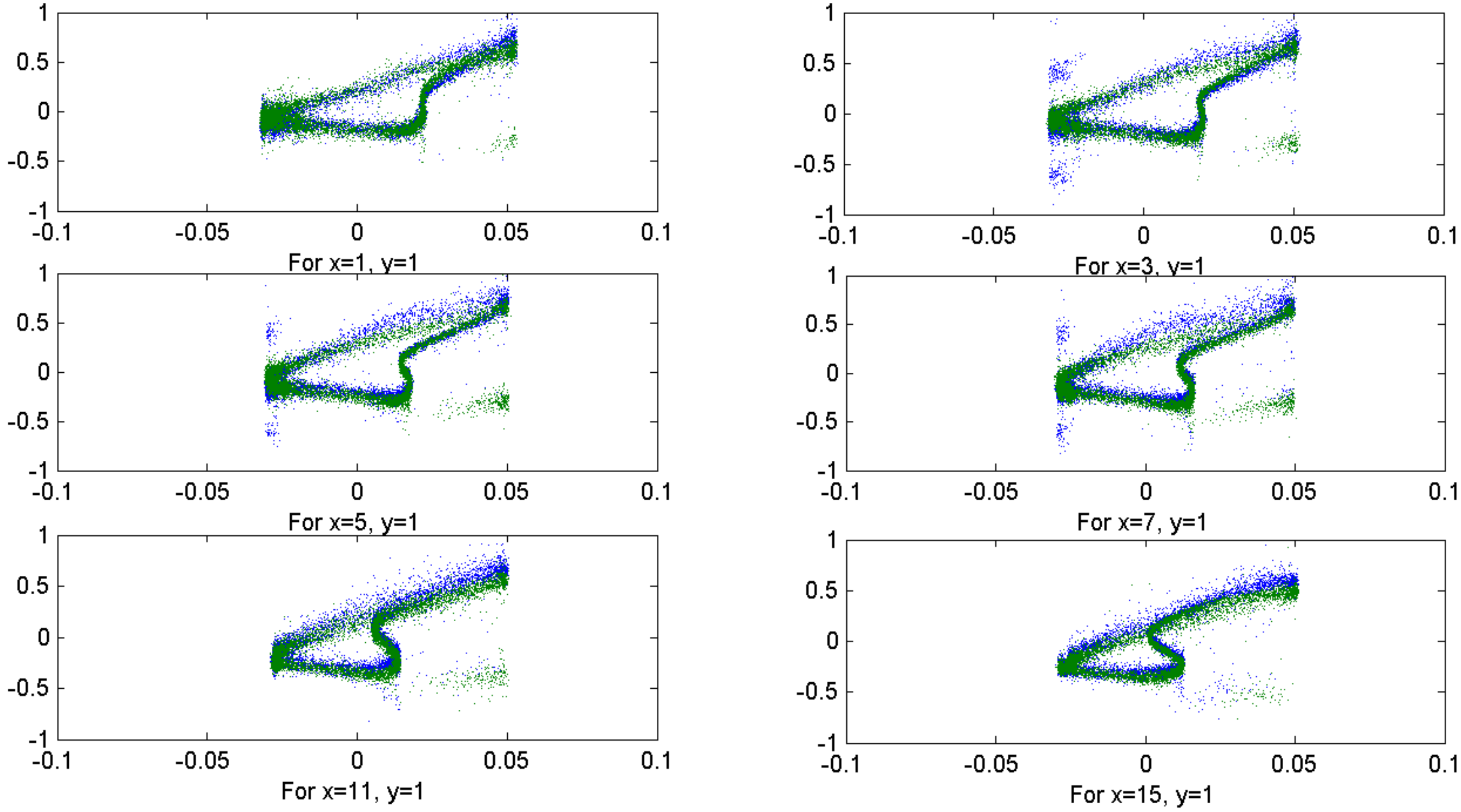
Experiment R010, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



Experiment R011, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



Experiment R012, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]


Experiment R015, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

For x=1, y=1

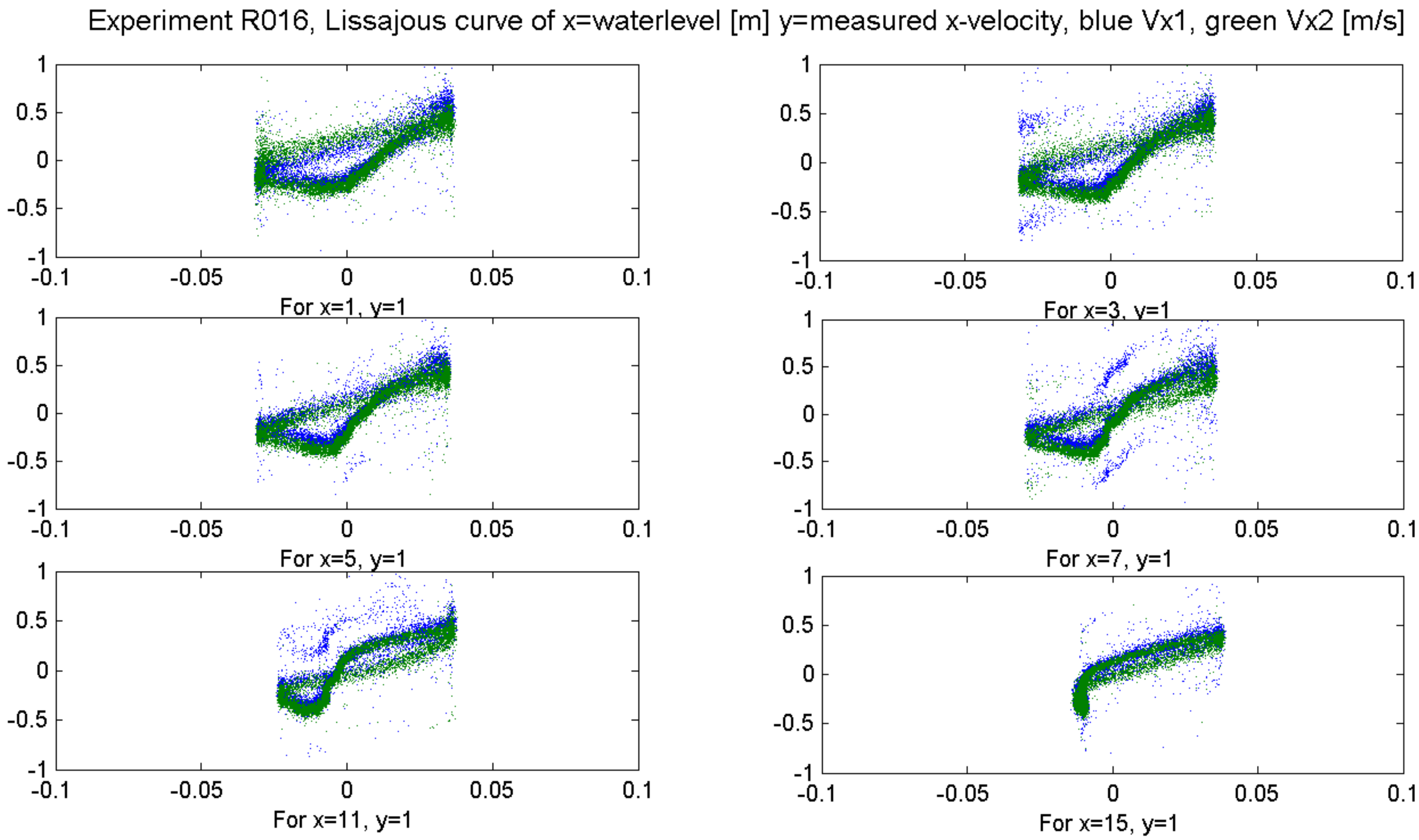
For x=3, y=1

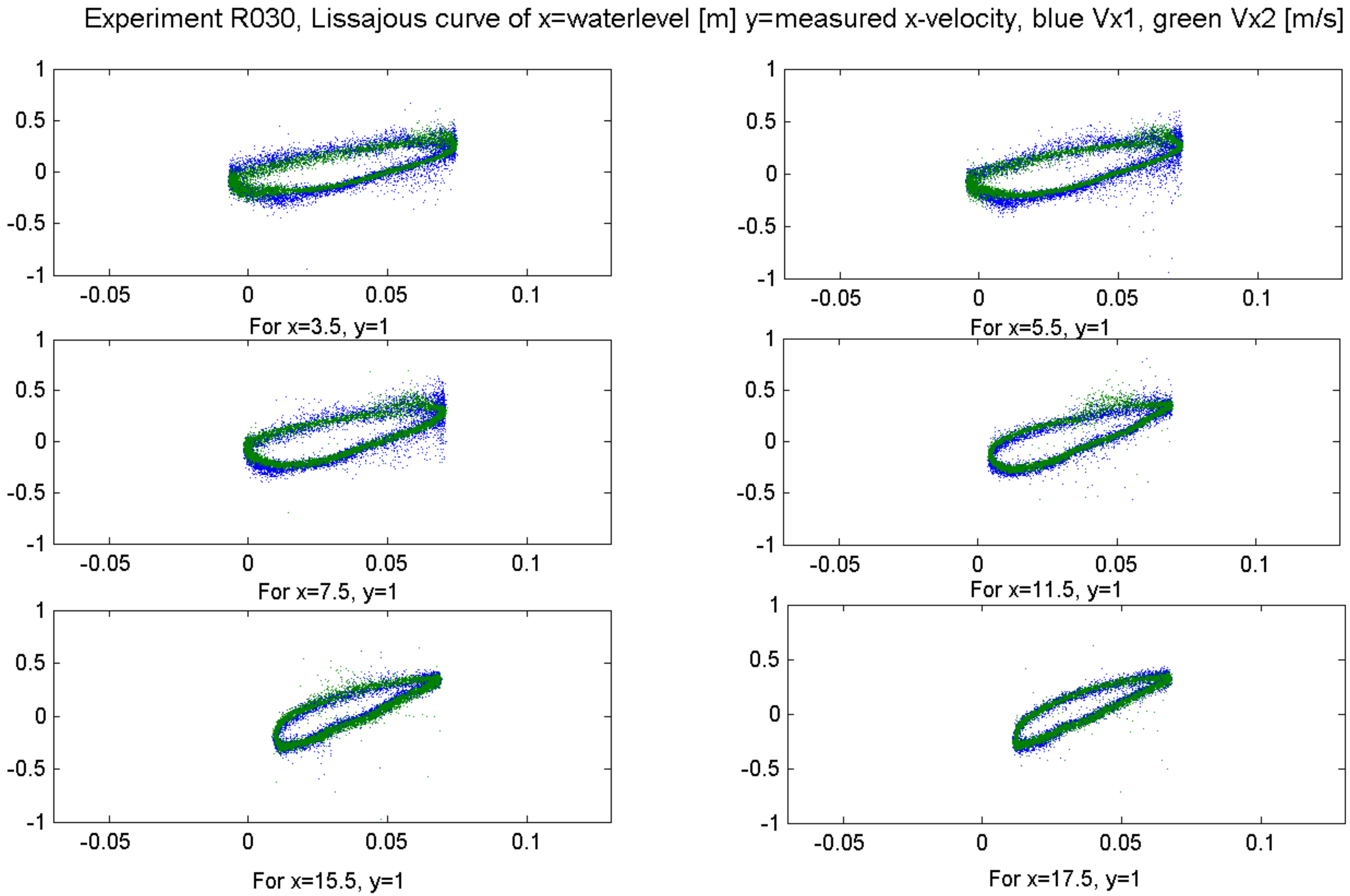
For x=5, y=1

For x=7, y=1

For x=11, y=1

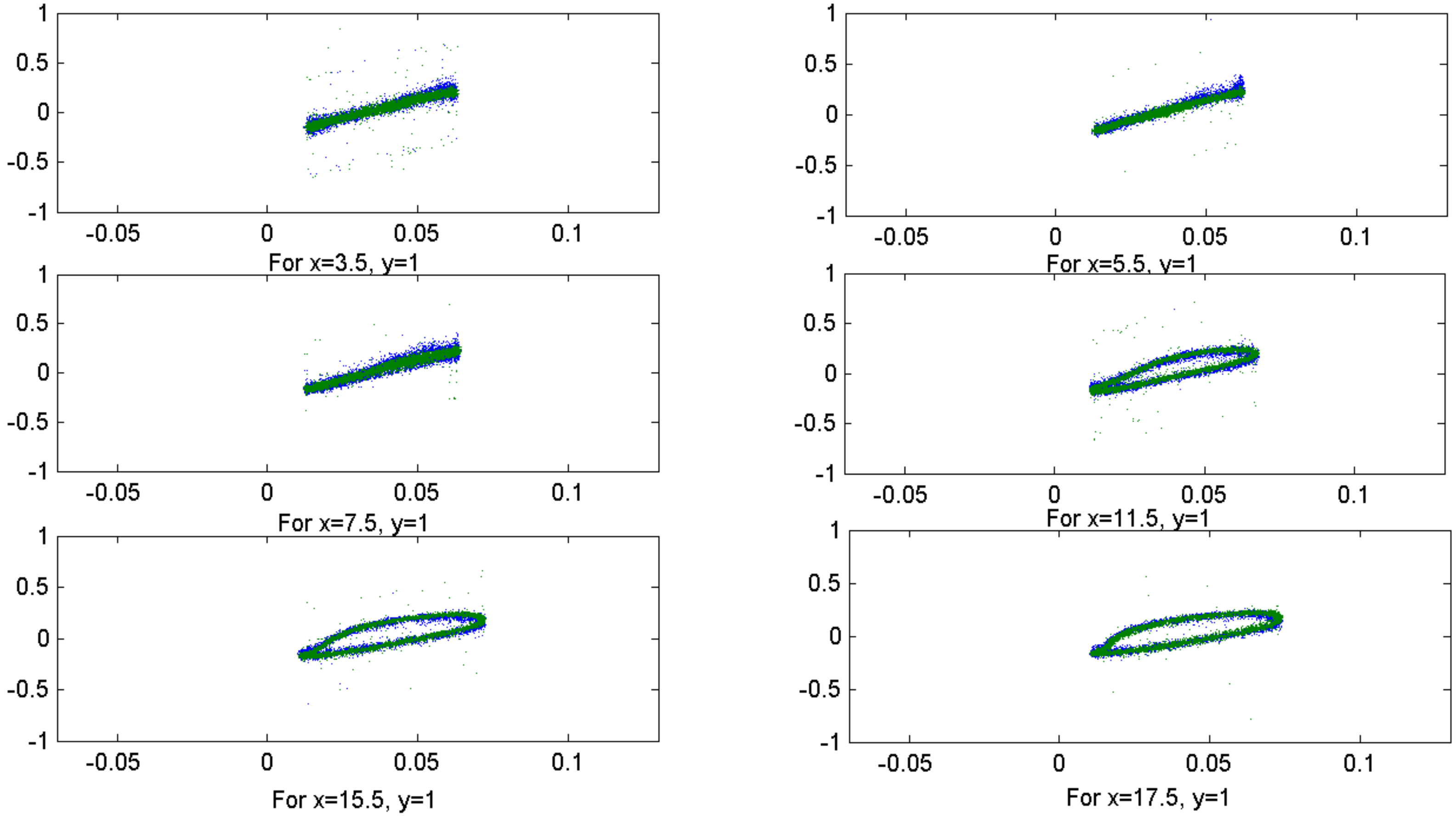
For x=15, y=1


Experiment R016, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

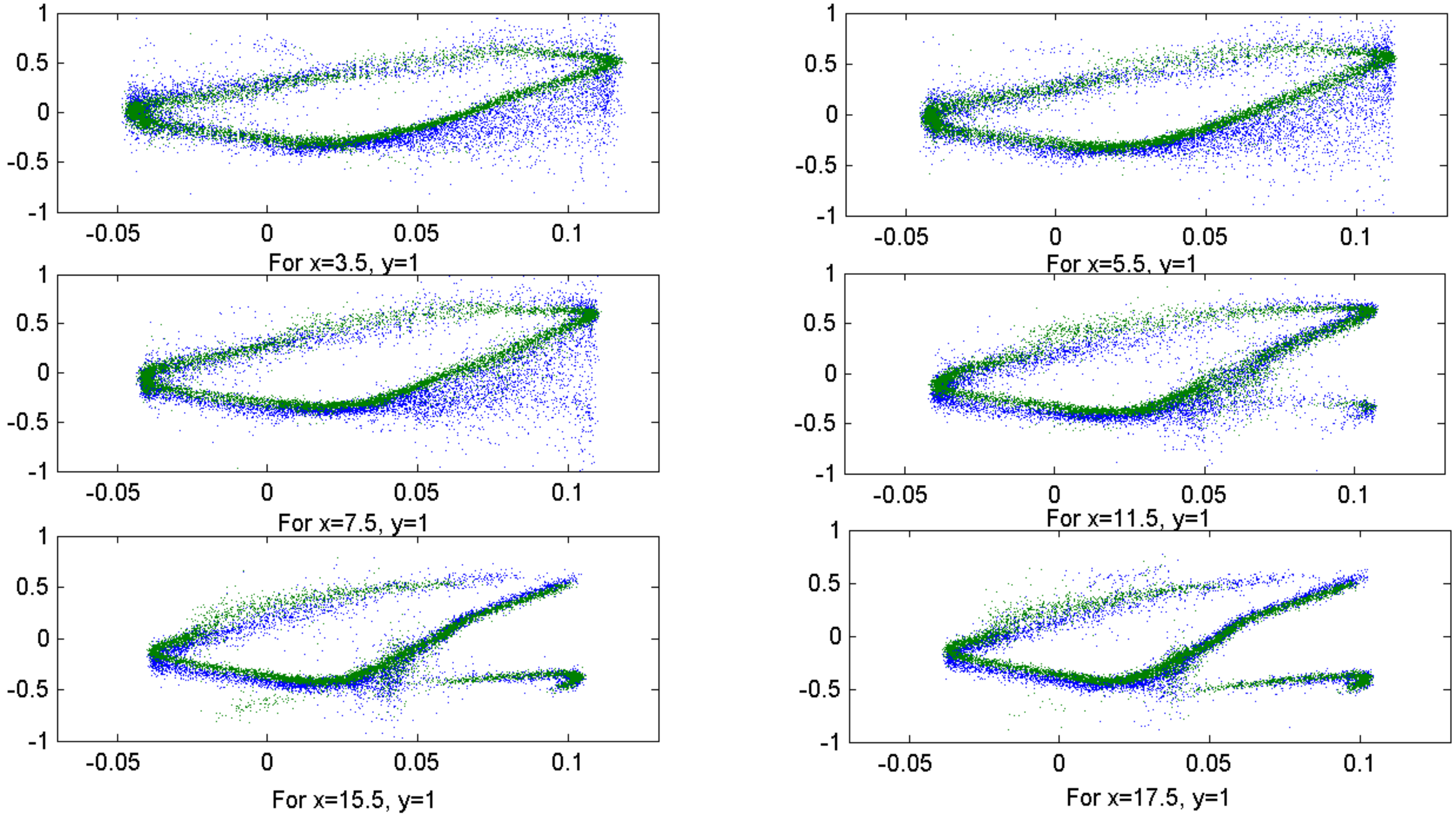


Experiment R030, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

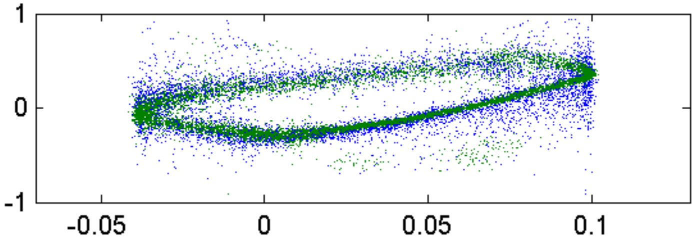
Experiment R031, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



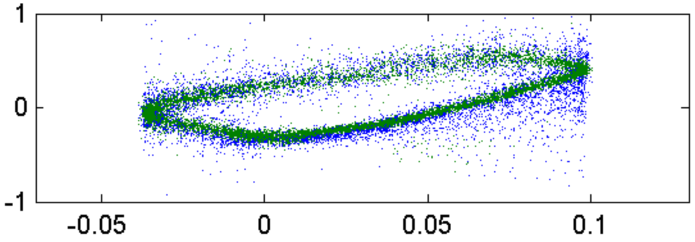
Experiment R032, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



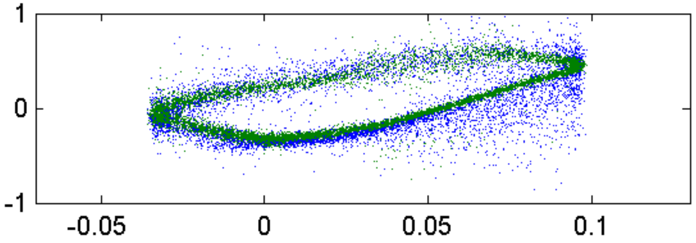
Experiment R033, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



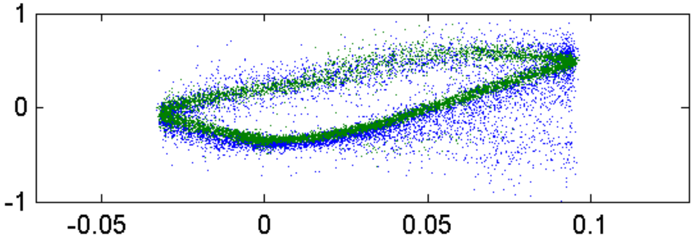
For x=1.5, y=1



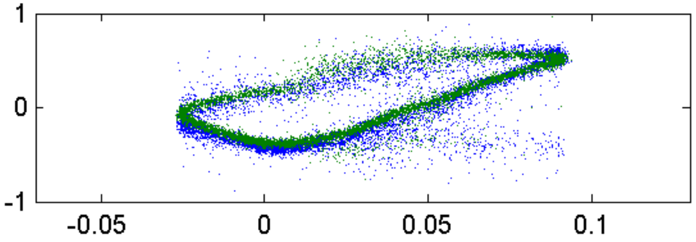
For x=3.5, y=1



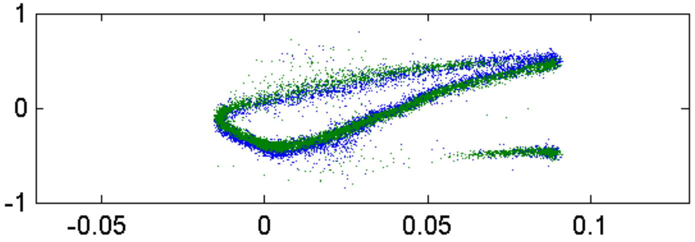
For x=5.5, y=1



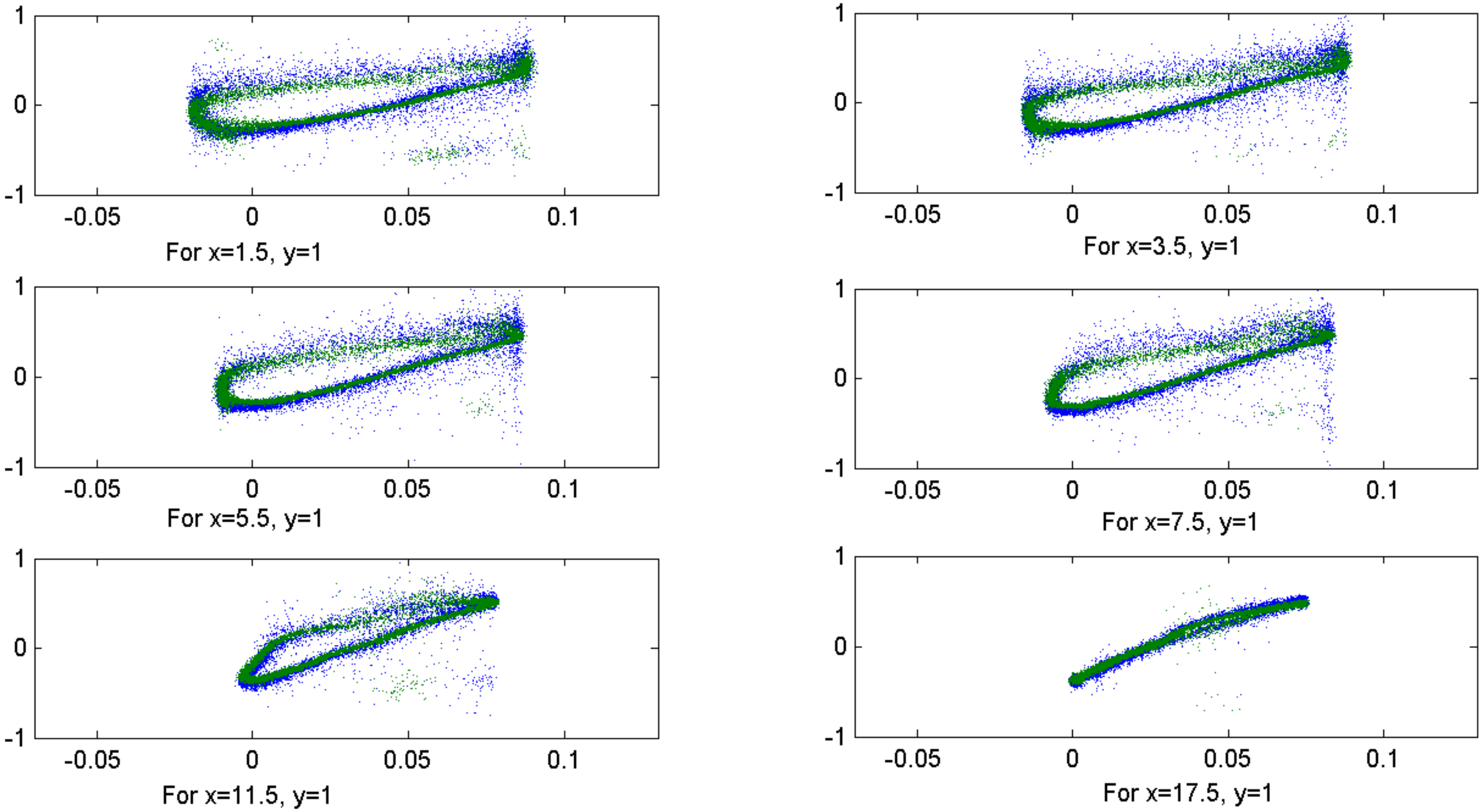
For x=7.5, y=1



For x=11.5, y=1

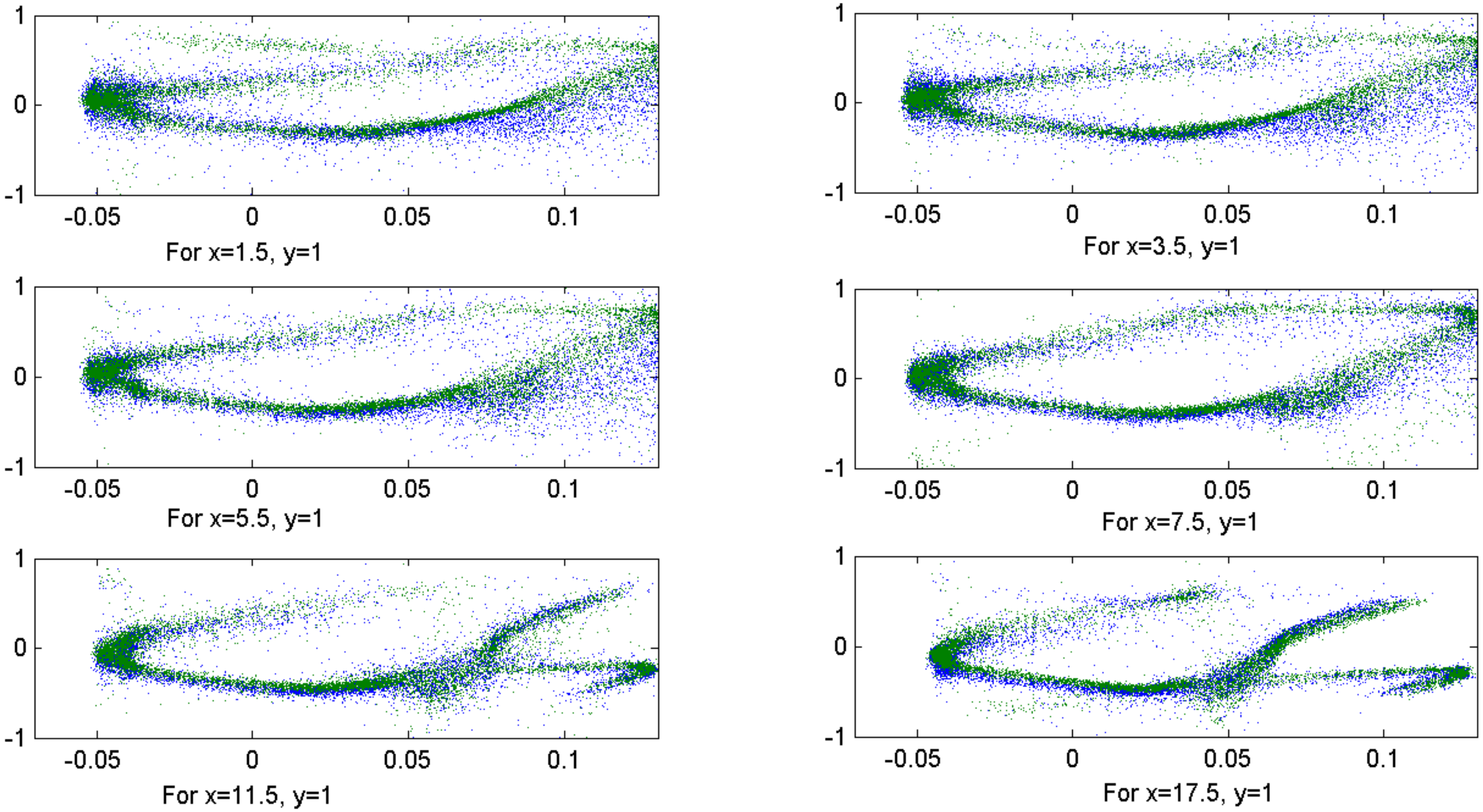


For x=17.5, y=1



Experiment R034, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

Experiment R035, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



For x=1.5, y=1

For x=3.5, y=1

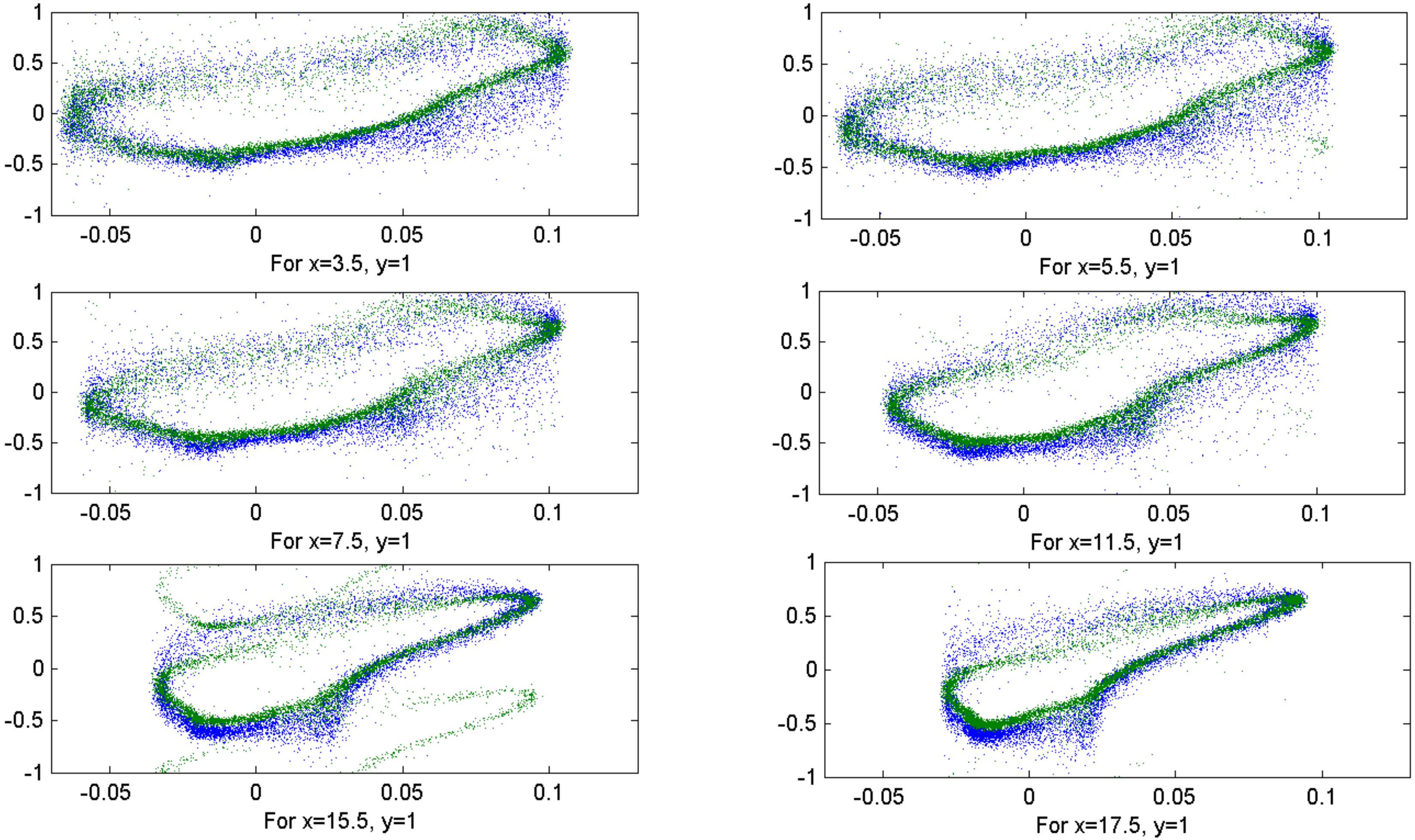
For x=5.5, y=1

For x=7.5, y=1

For x=11.5, y=1

For x=17.5, y=1

Experiment R036, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]



For x=3.5, y=1

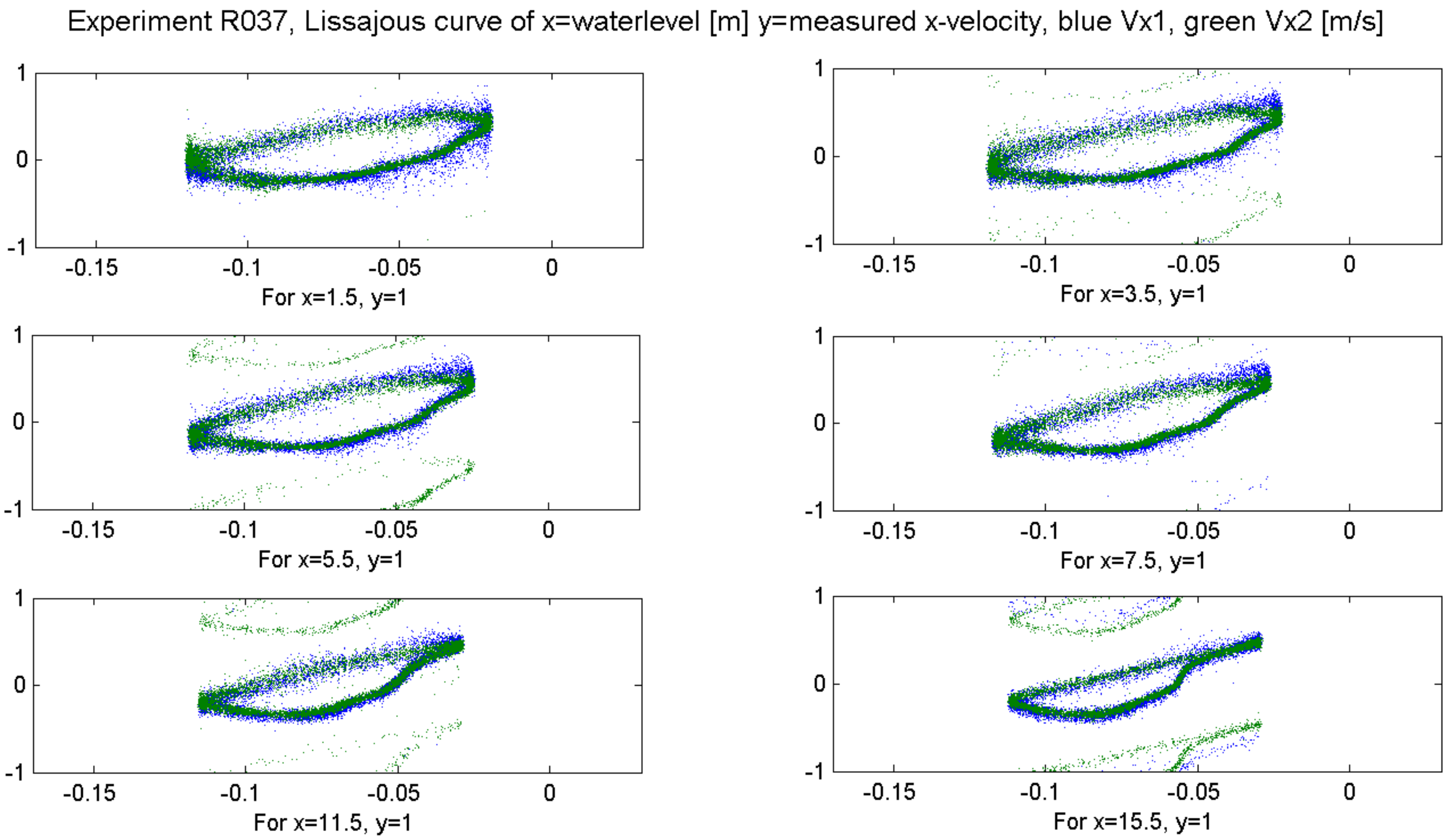
For x=5.5, y=1

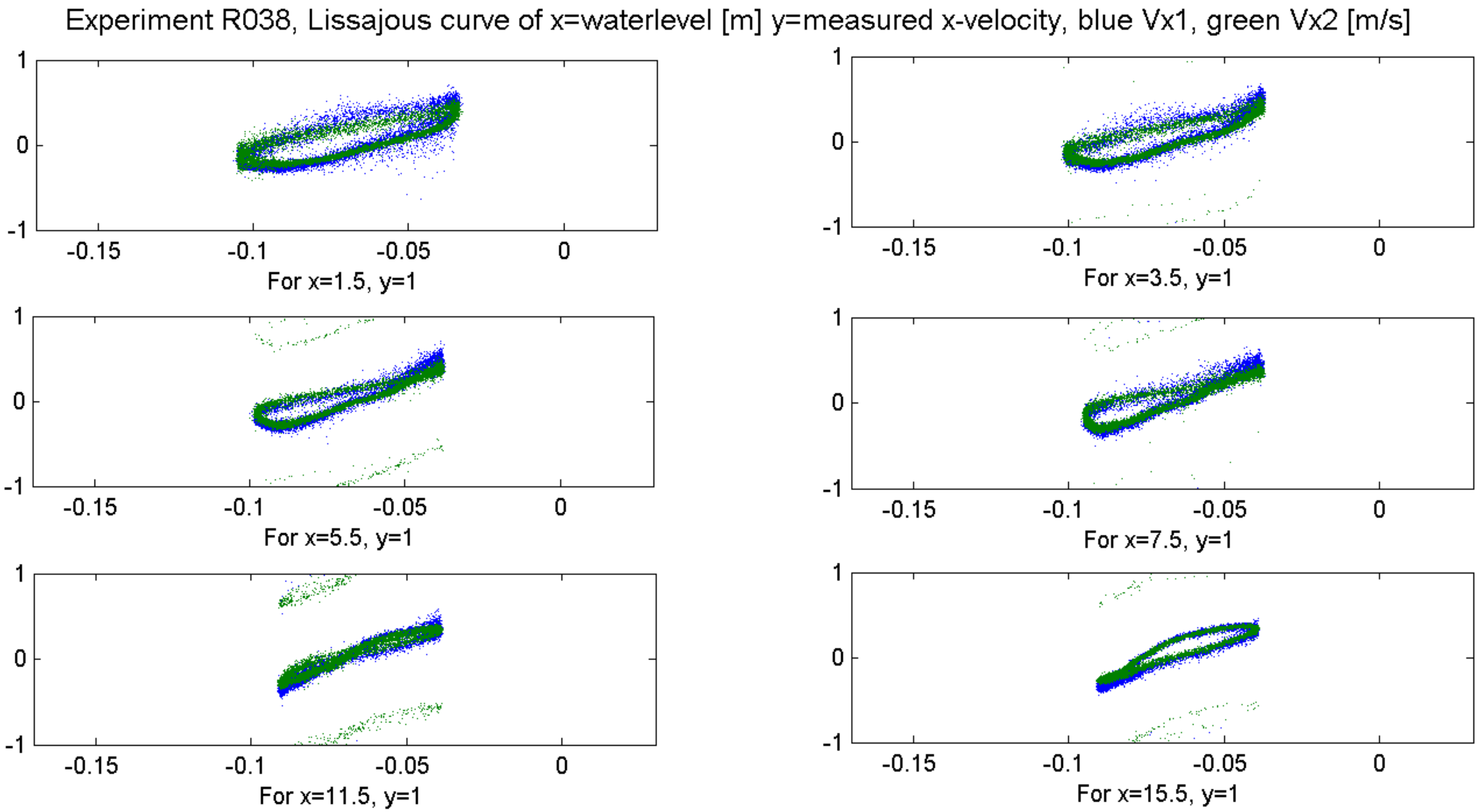
For x=7.5, y=1

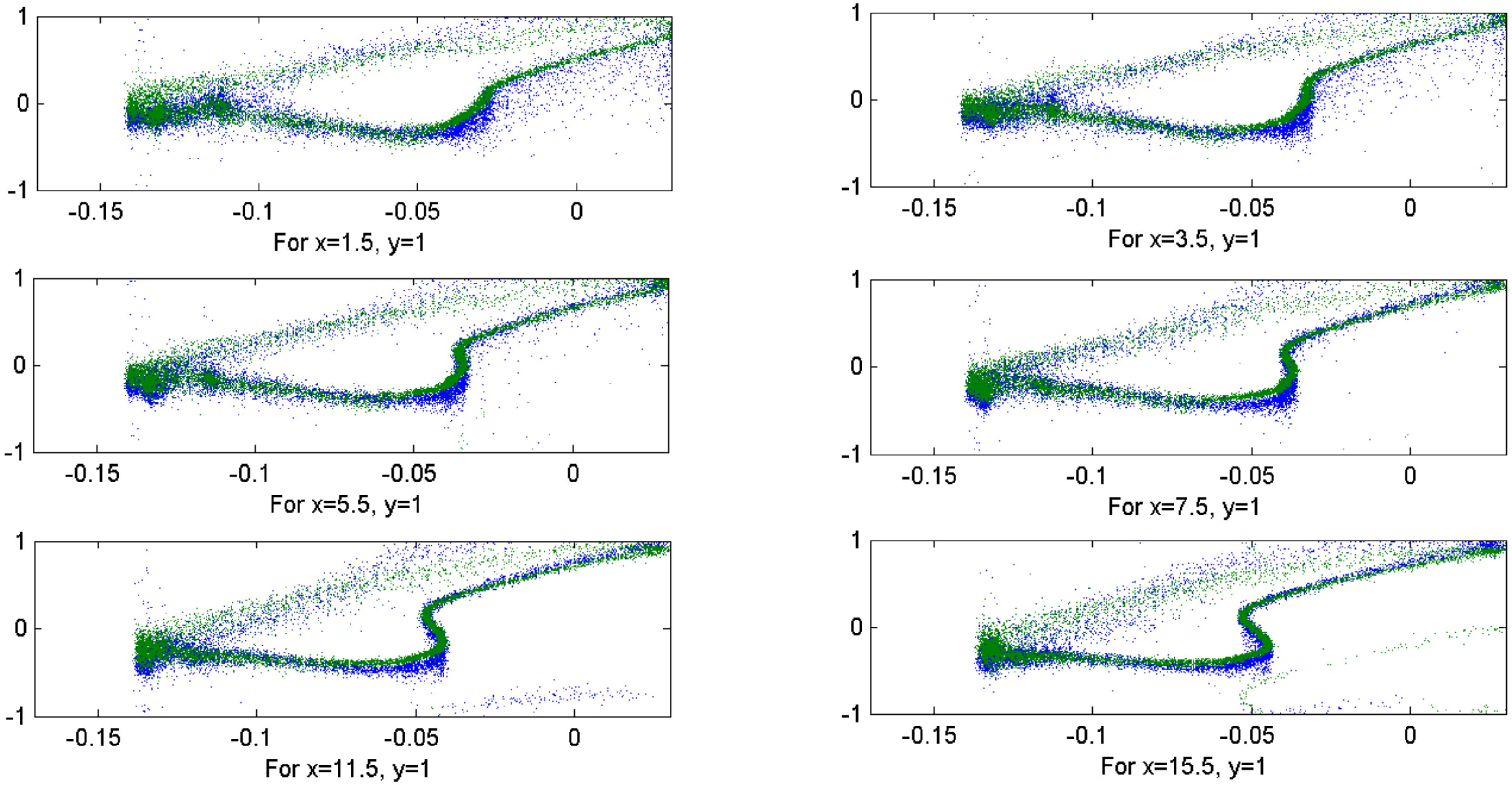
For x=11.5, y=1

For x=15.5, y=1

For x=17.5, y=1


Experiment R037, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]
1
0
-1
-0.15
-0.1
-0.05
0
For x=1.5, y=1
For x=3.5, y=1
For x=5.5, y=1
For x=7.5, y=1
For x=11.5, y=1
For x=15.5, y=1





Experiment R039, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

For x=1.5, y=1

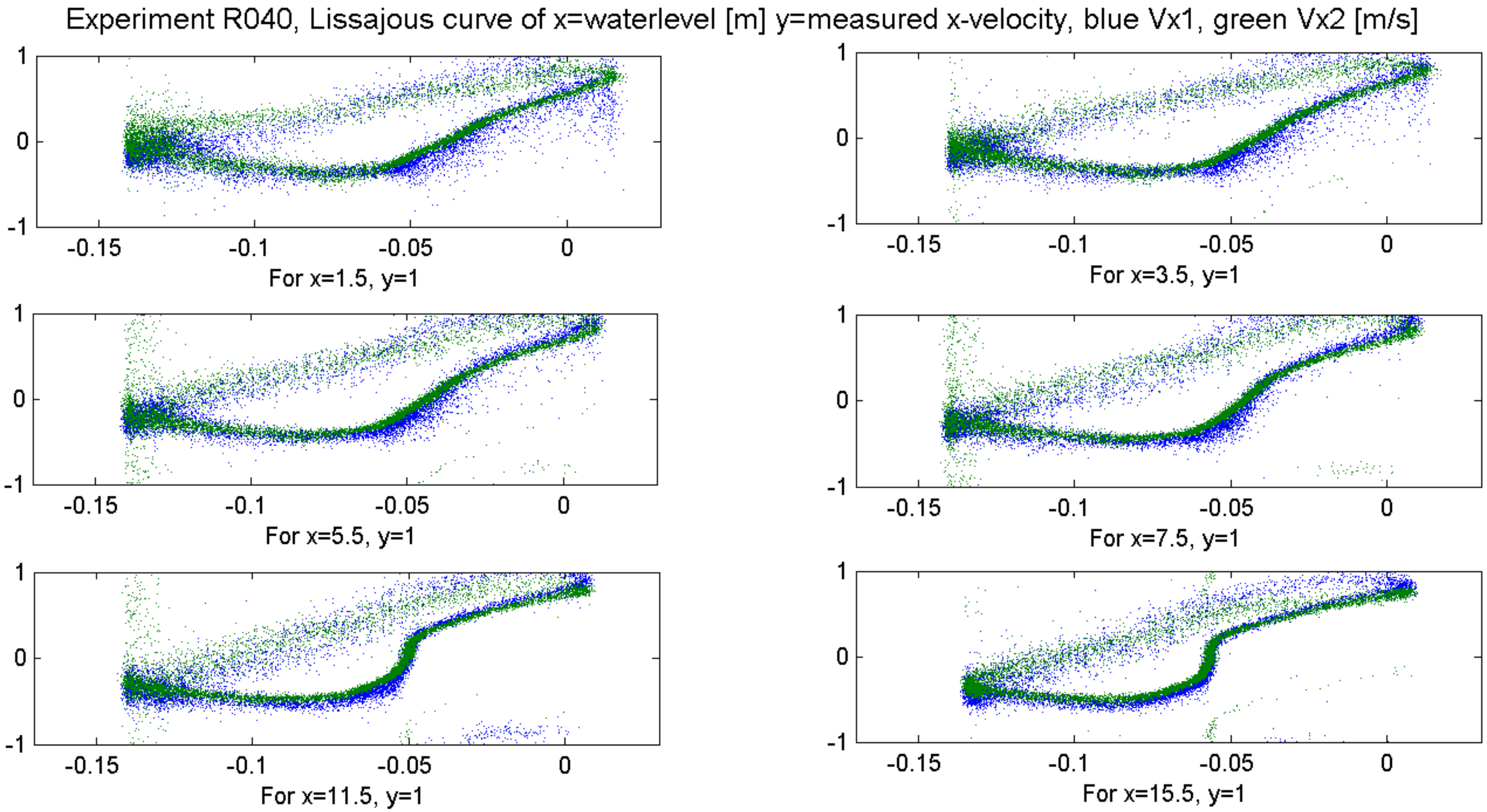
For x=3.5, y=1

For x=5.5, y=1

For x=7.5, y=1

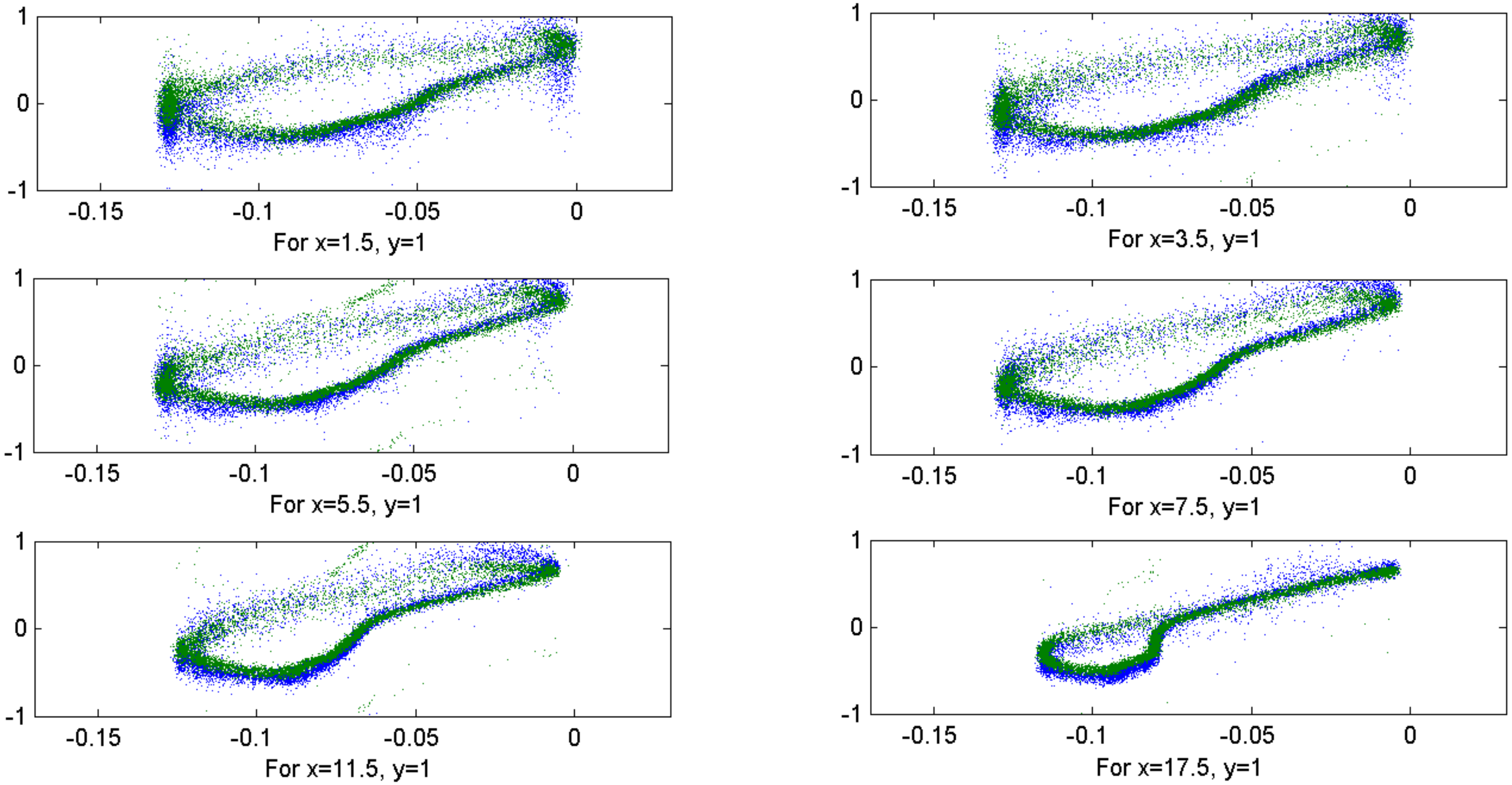
For x=11.5, y=1

For x=15.5, y=1



Experiment R040, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]

Experiment R041, Lissajous curve of x=waterlevel [m] y=measured x-velocity, blue Vx1, green Vx2 [m/s]


For x=1.5, y=1

For x=3.5, y=1

For x=5.5, y=1

For x=7.5, y=1

For x=11.5, y=1

For x=17.5, y=1

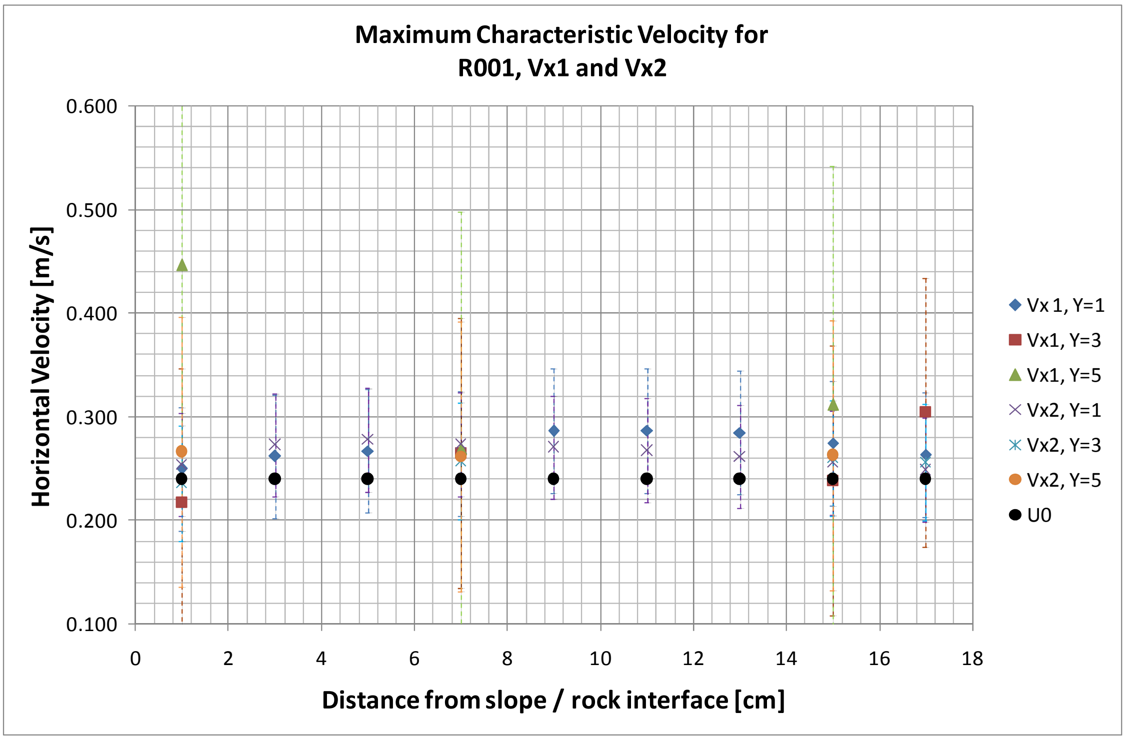


FIGURE 1 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R001

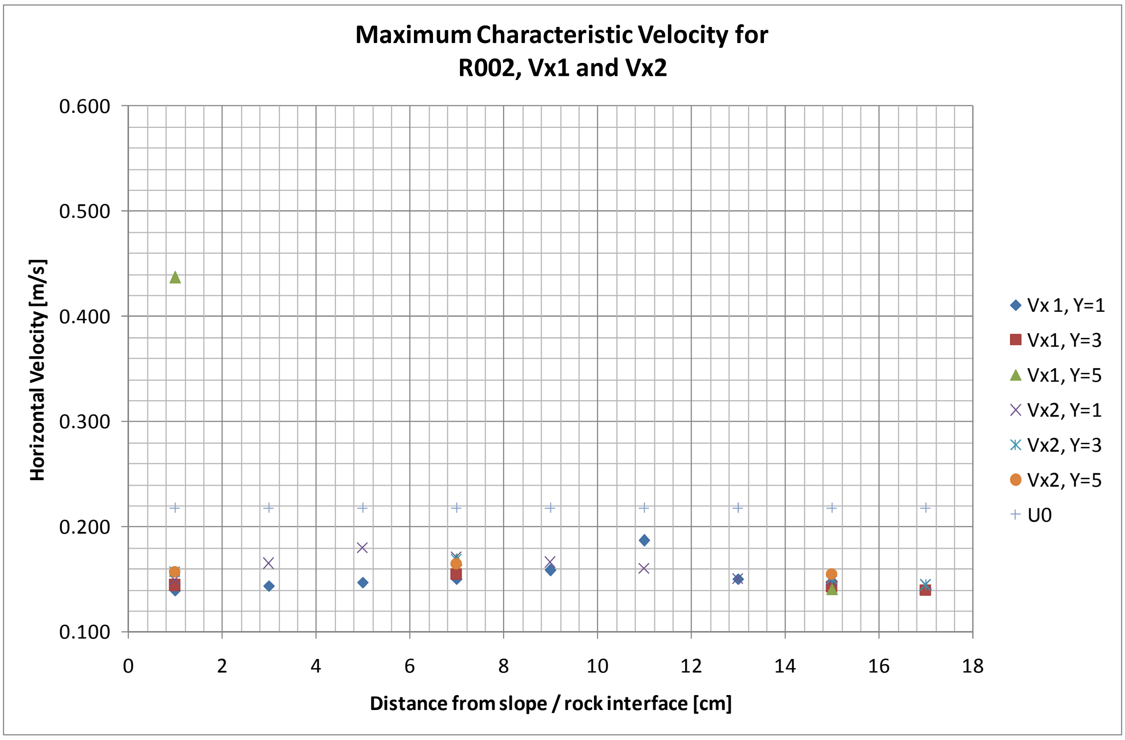


FIGURE 2 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R002

Appendix D – Maximum Velocity Distribution Plots

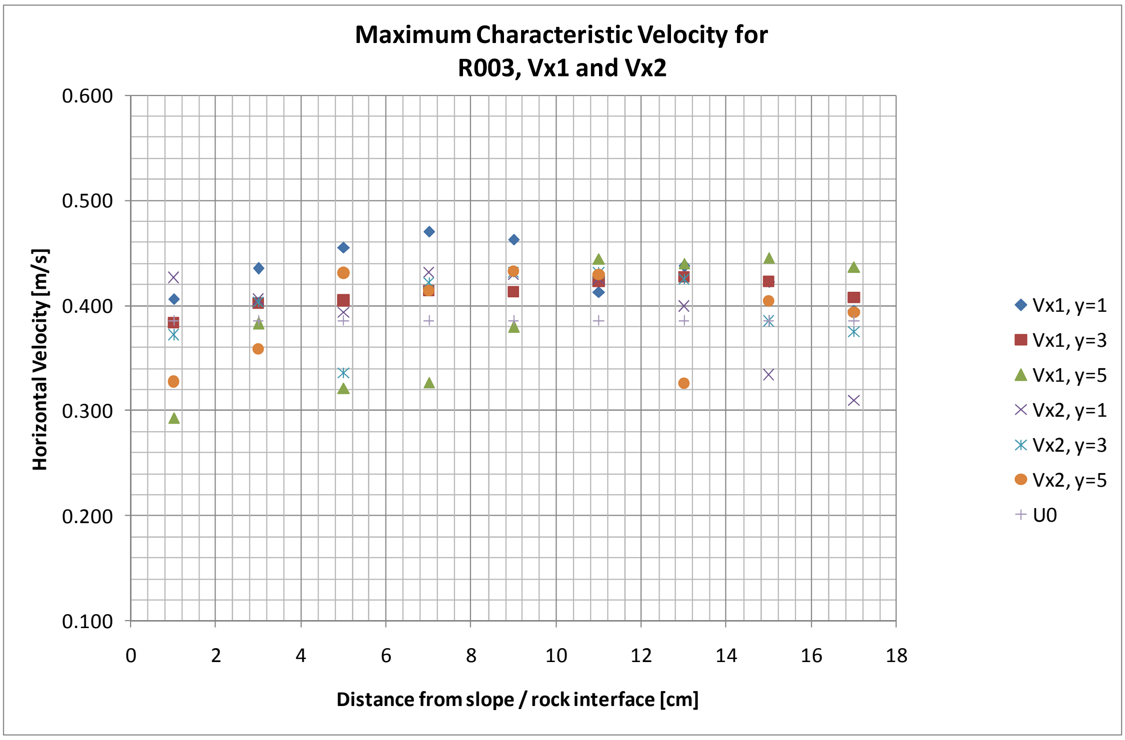


FIGURE 3 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R003

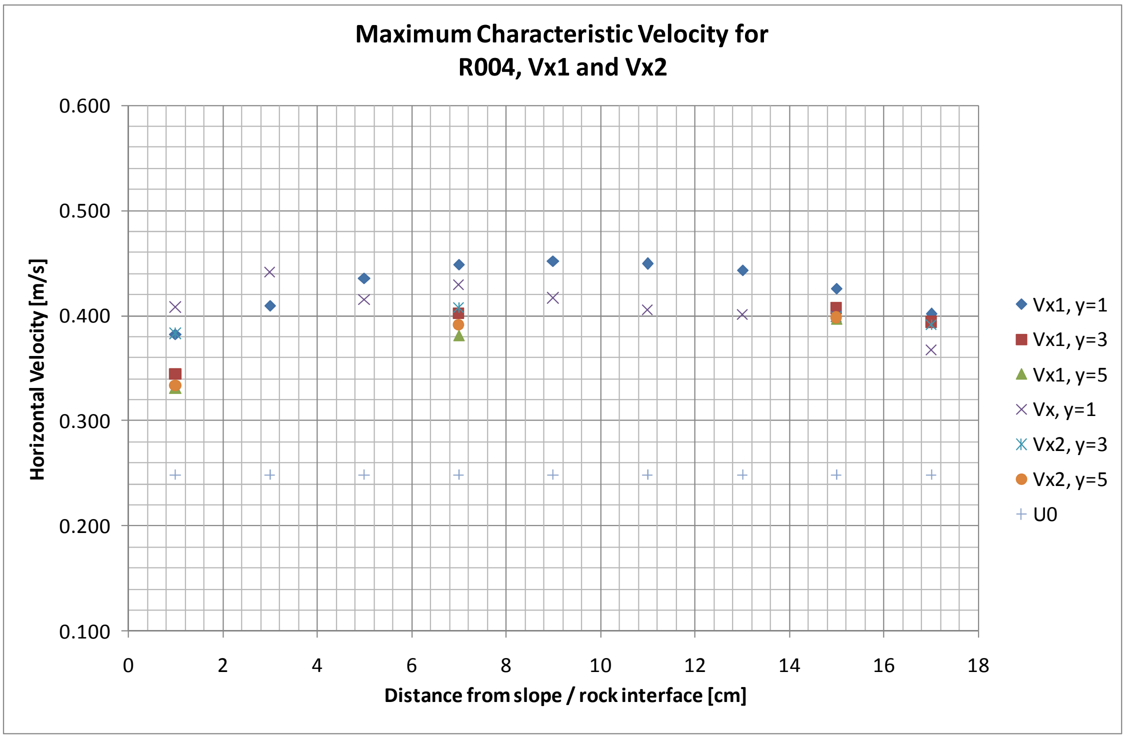


FIGURE 4 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R004

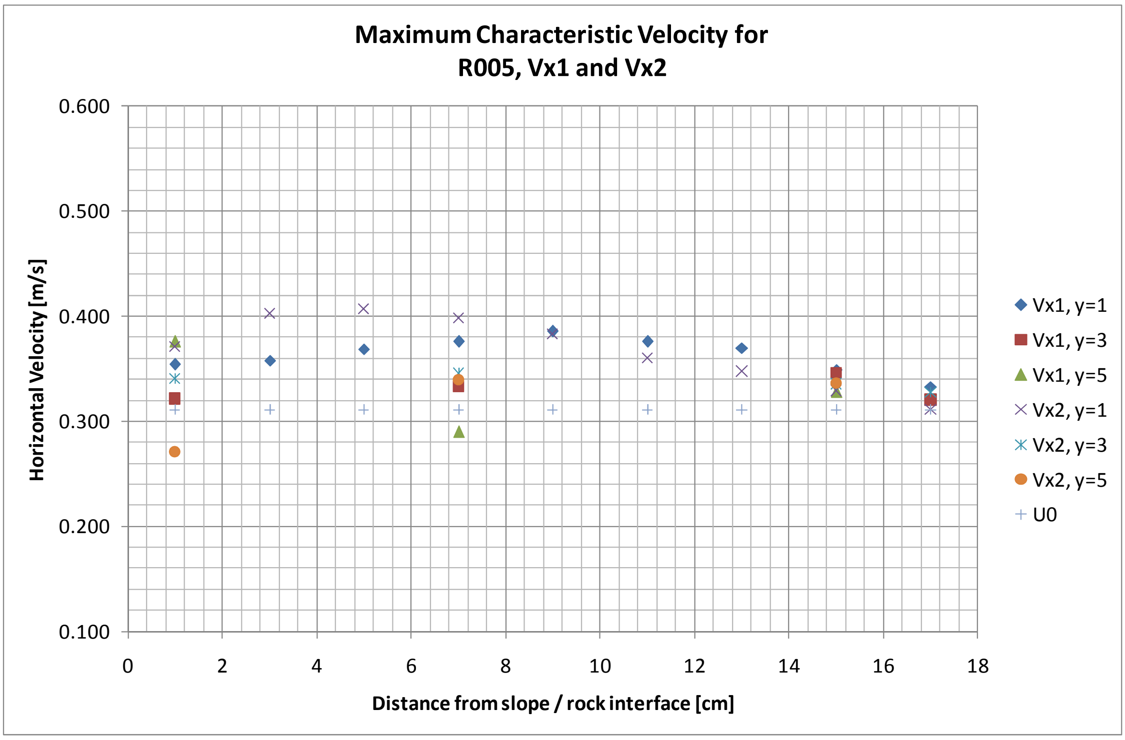


FIGURE 5 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R005

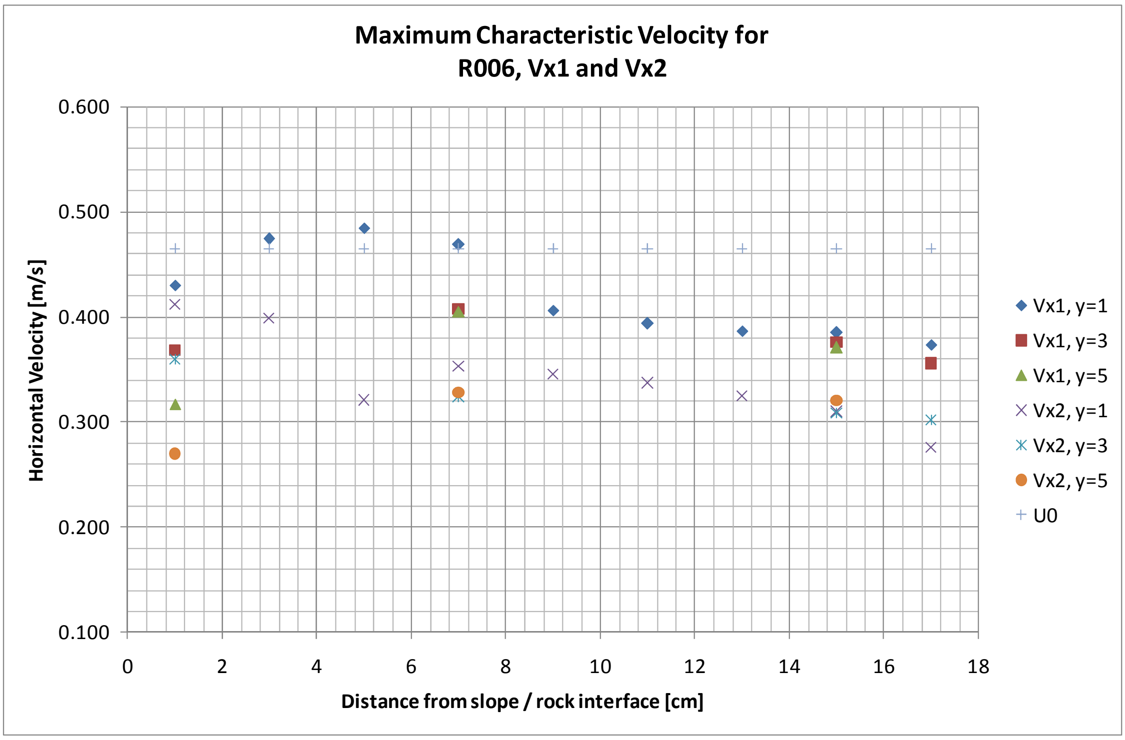


FIGURE 6 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R006

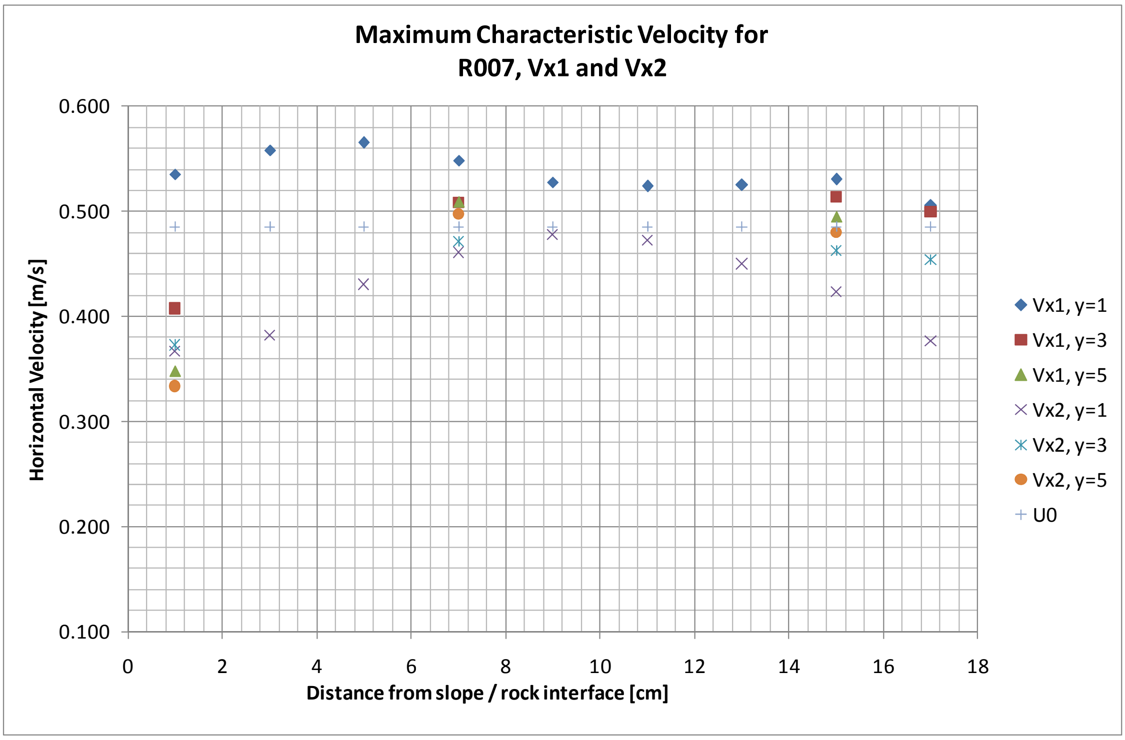


FIGURE 7 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R007

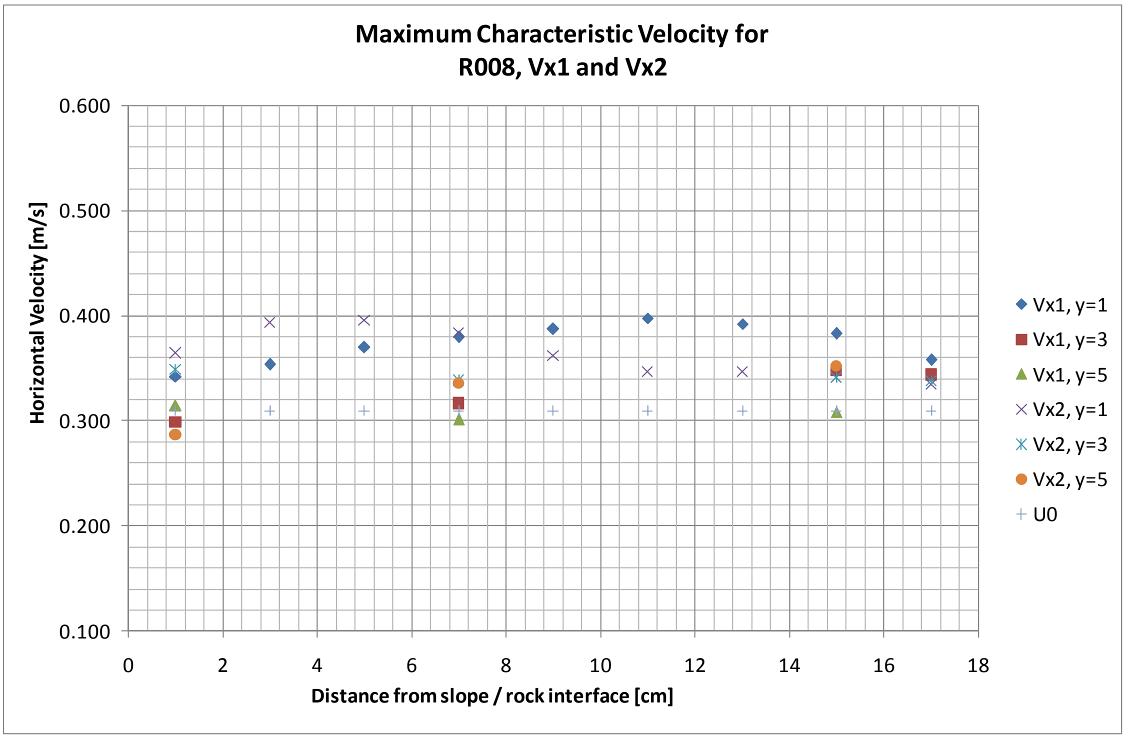


FIGURE 8 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R008

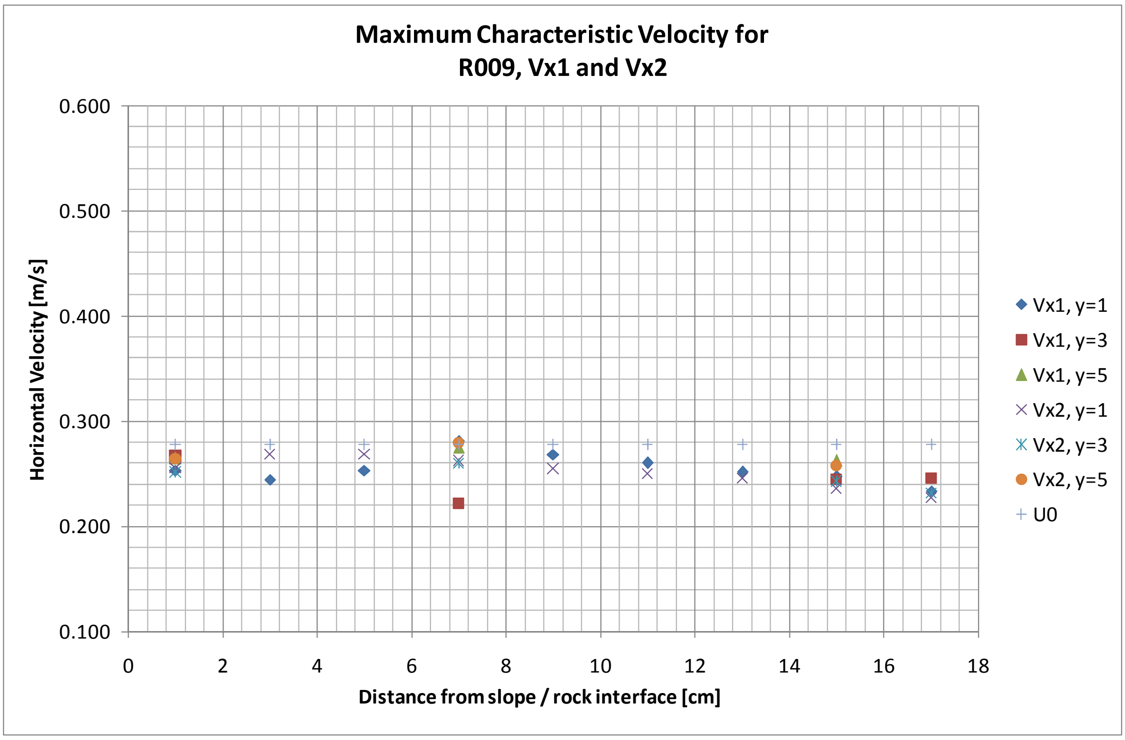


FIGURE 9 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R009

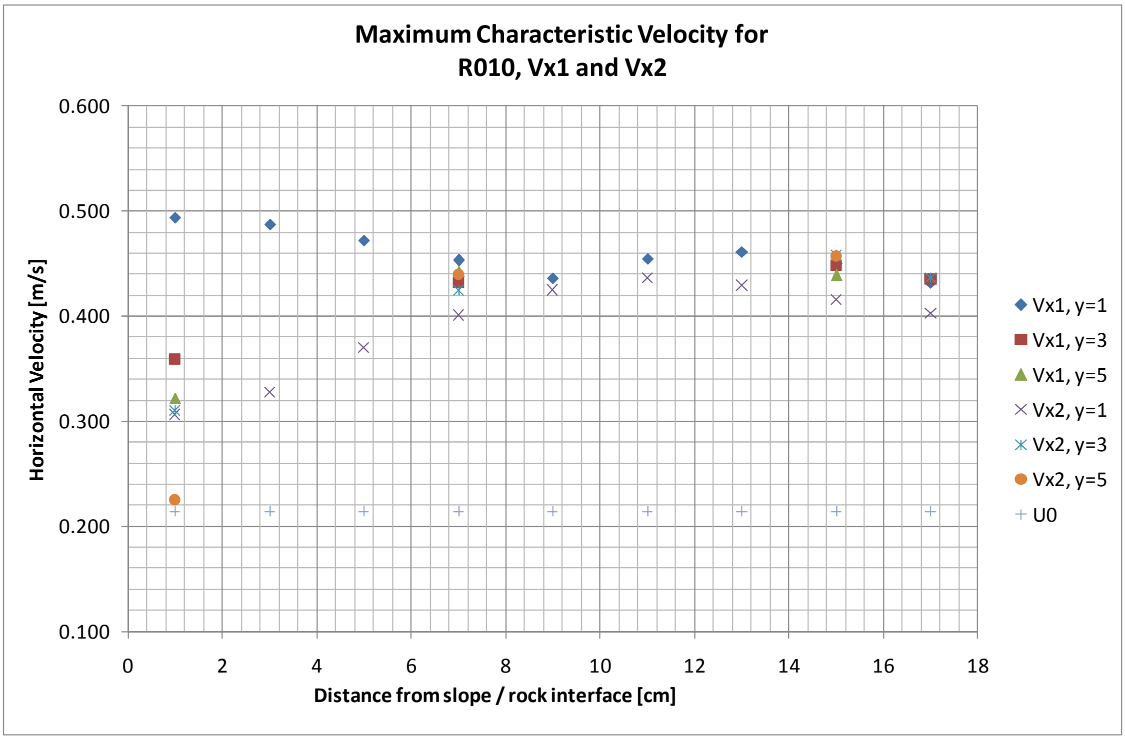


FIGURE 10 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R010

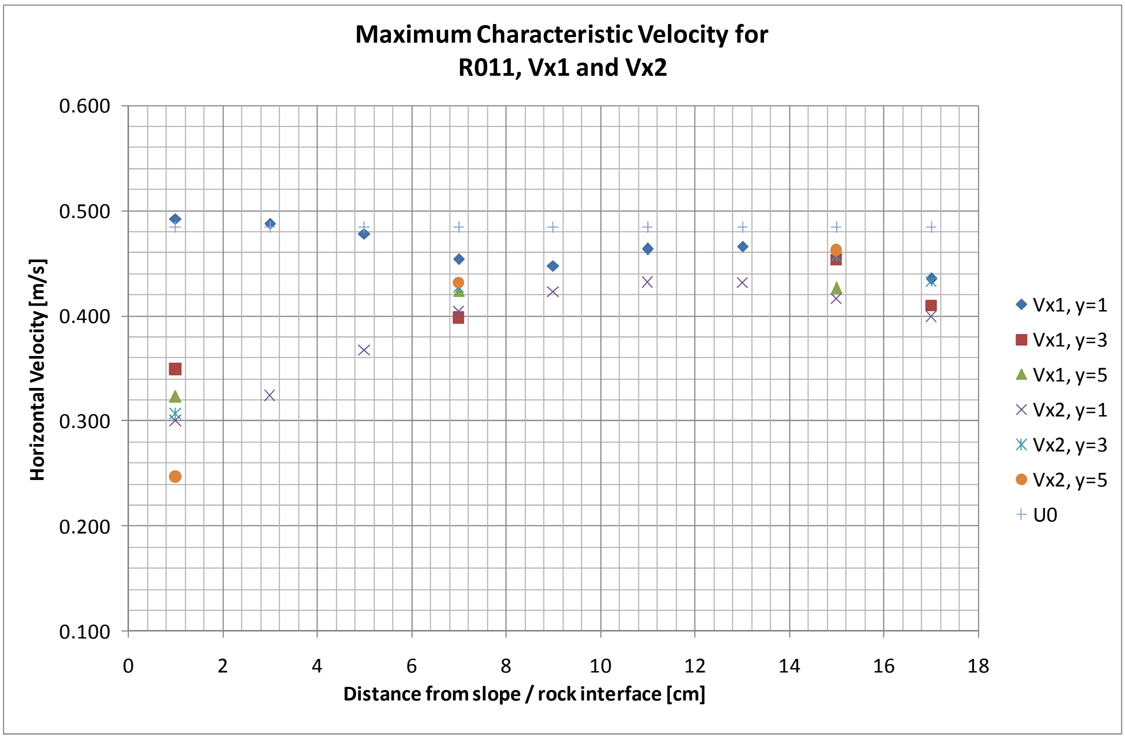


FIGURE 11 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R011

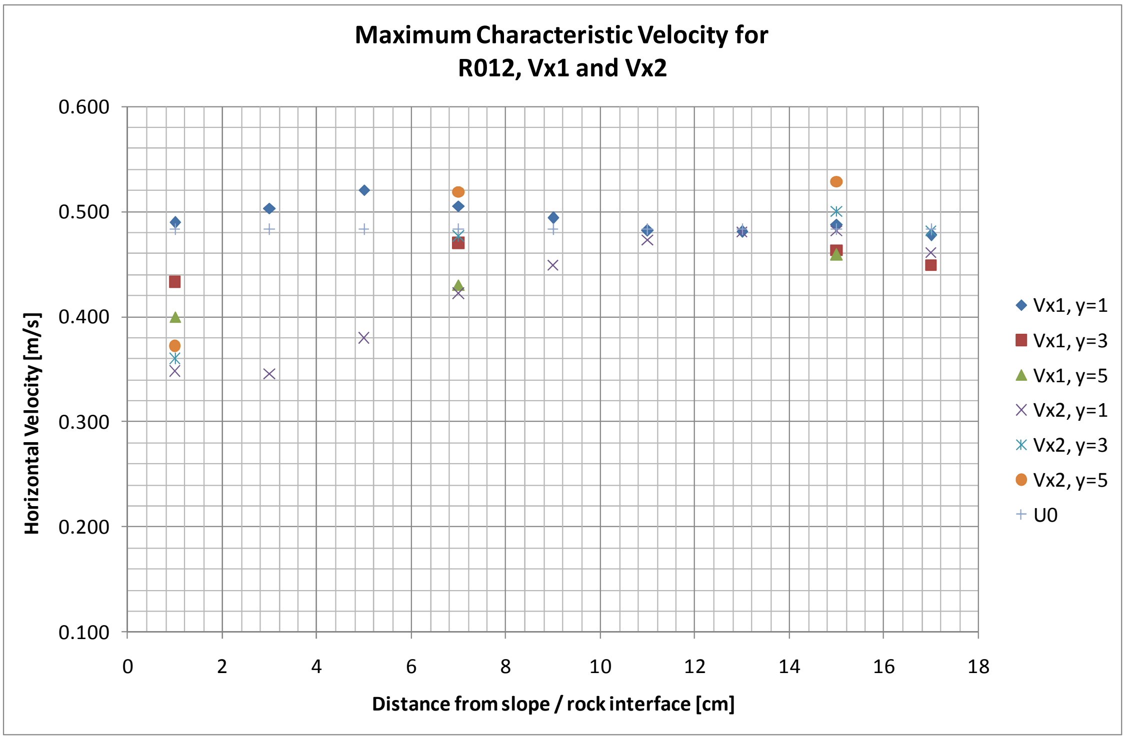


FIGURE 12 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R012

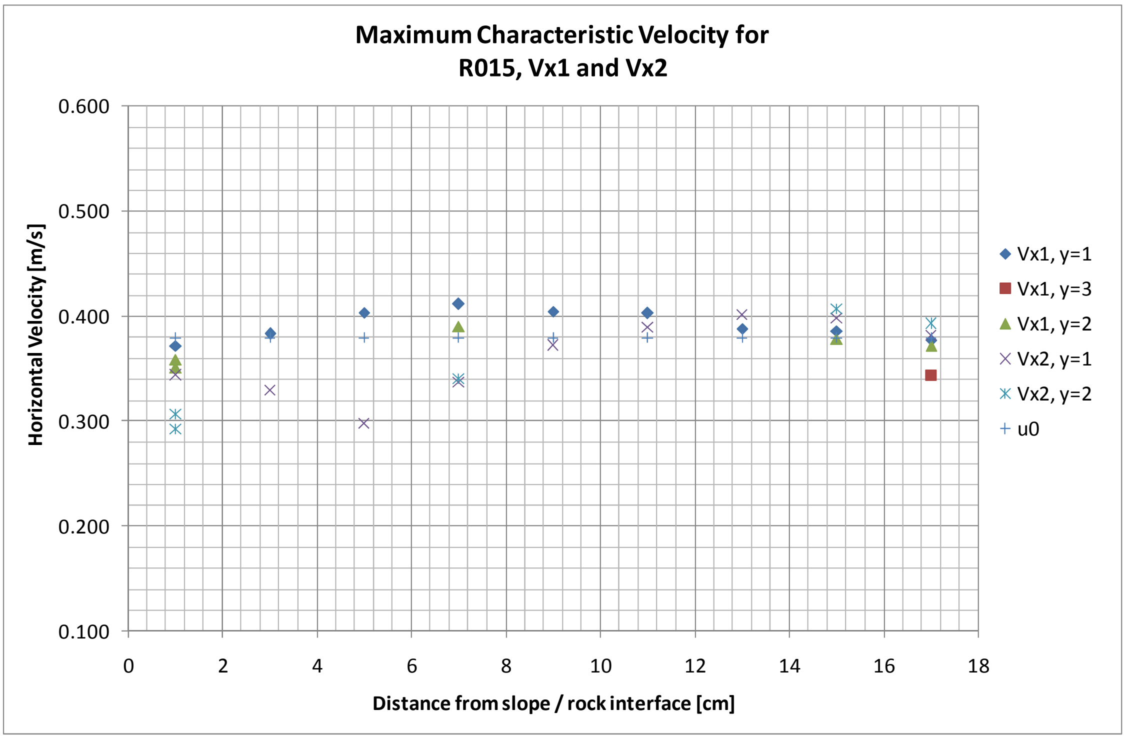


FIGURE 13 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R015

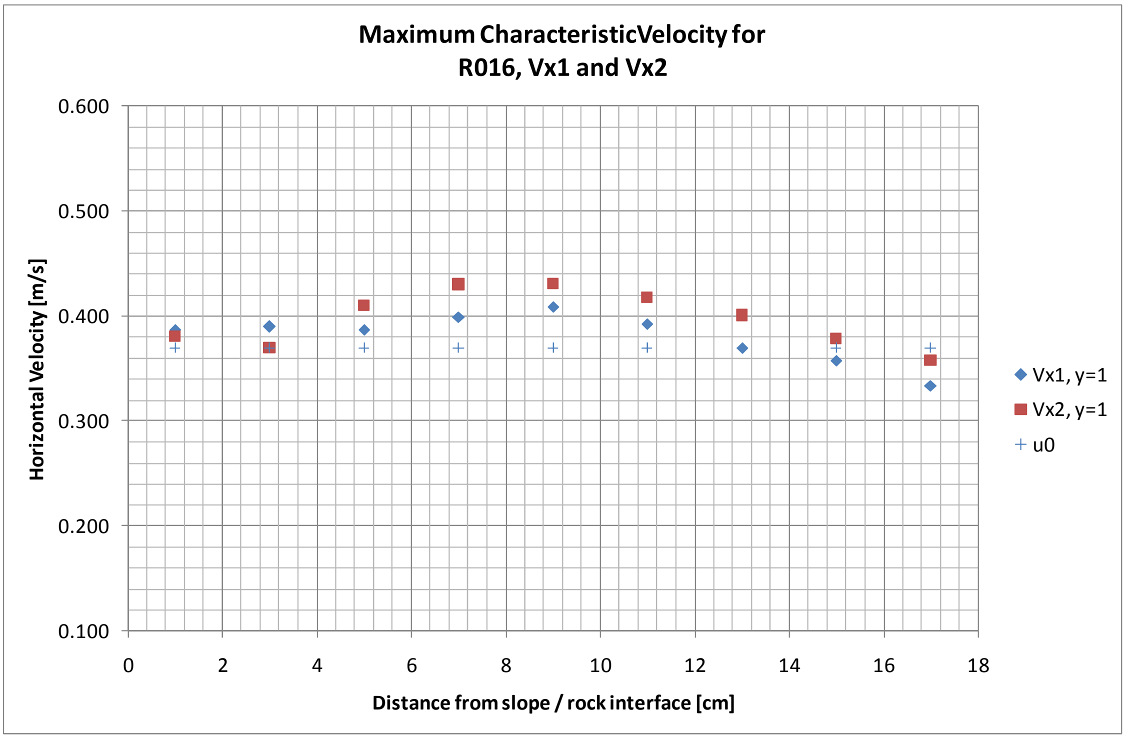


FIGURE 14 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R016

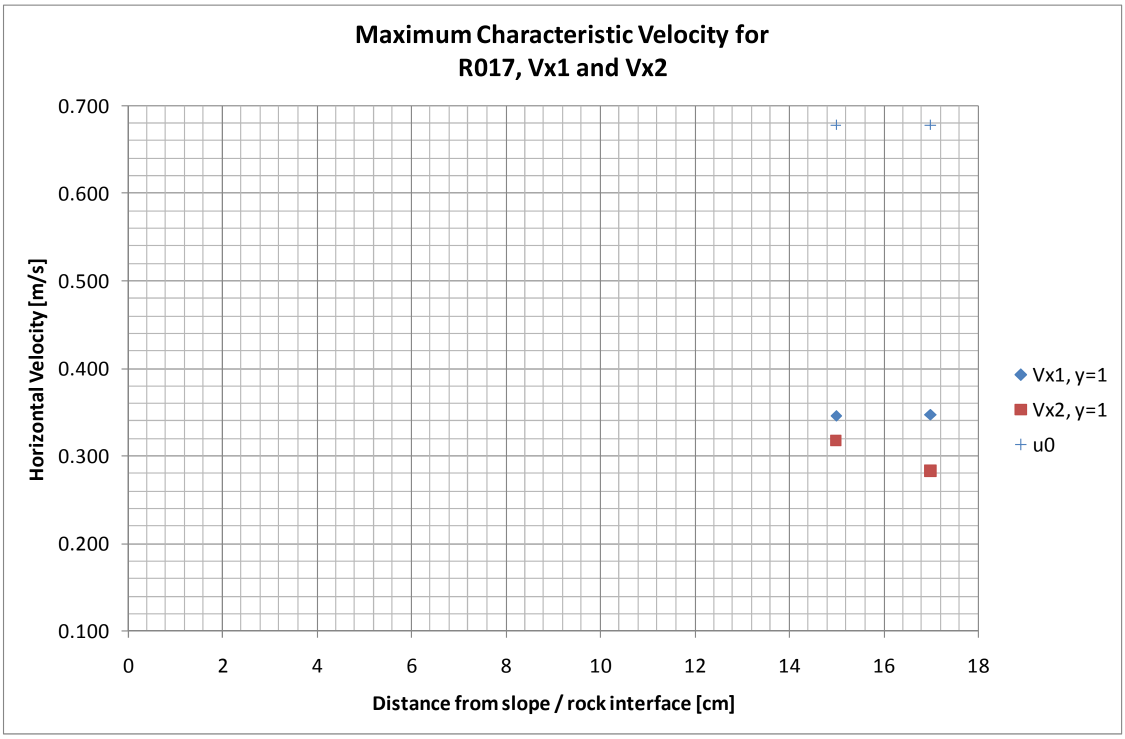


FIGURE 15 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R017

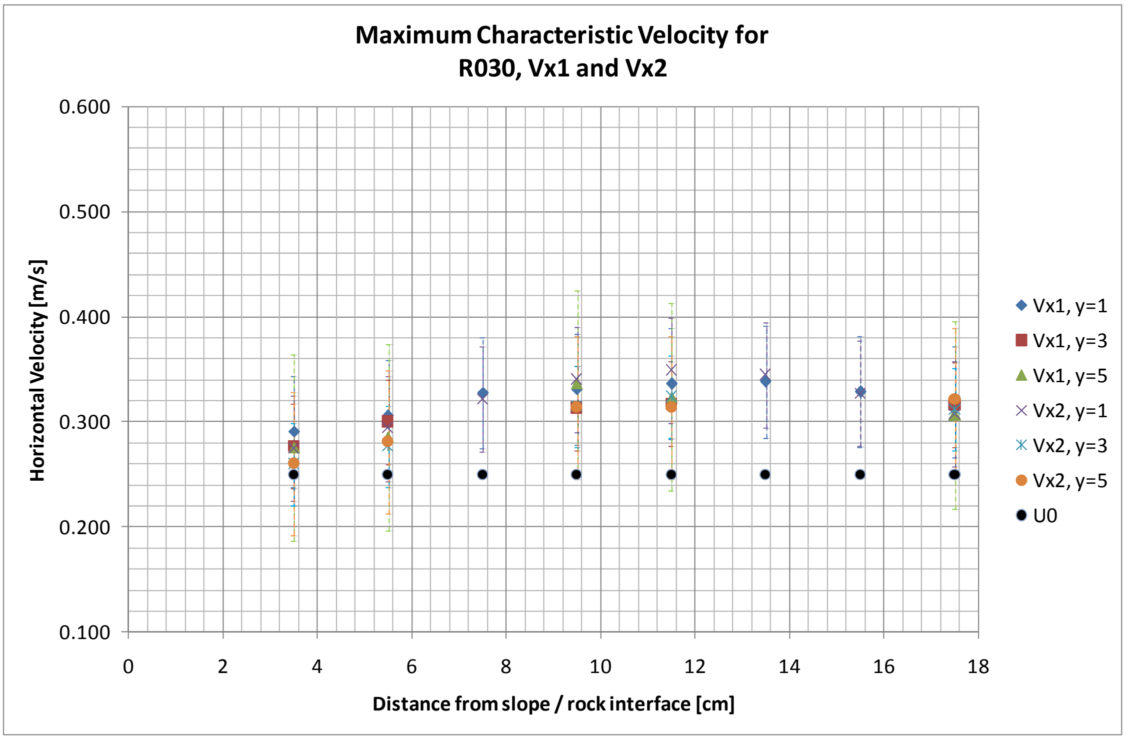


FIGURE 16 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R030

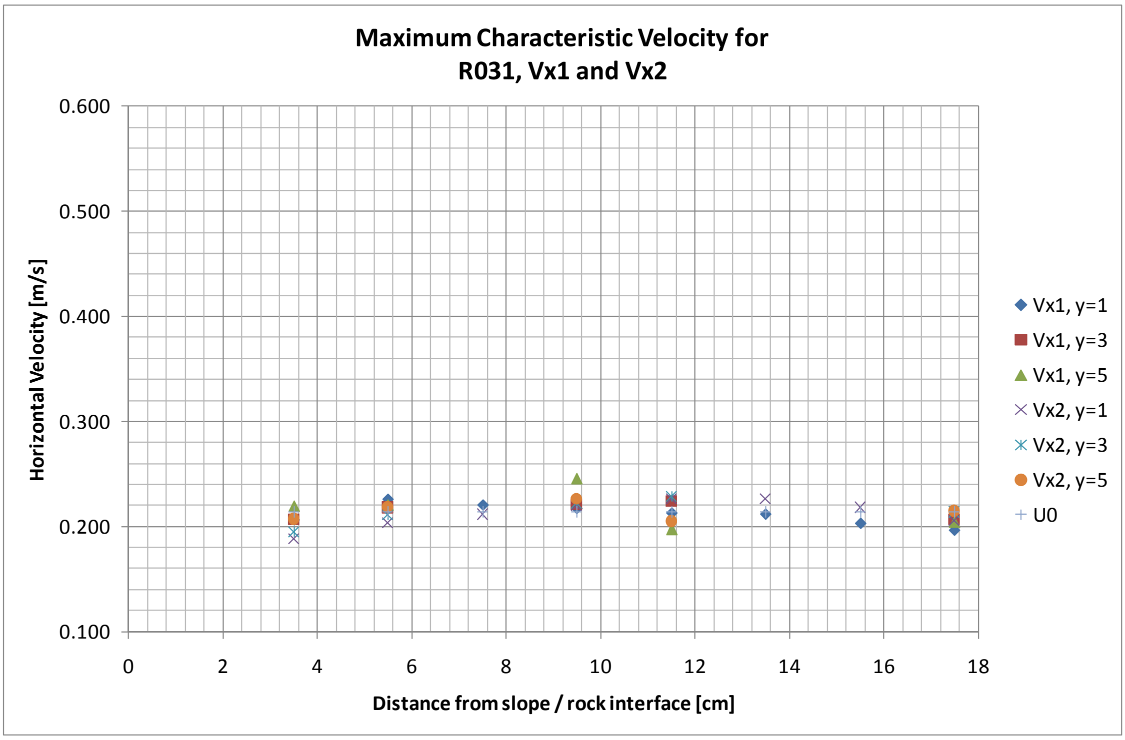


FIGURE 17 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R031

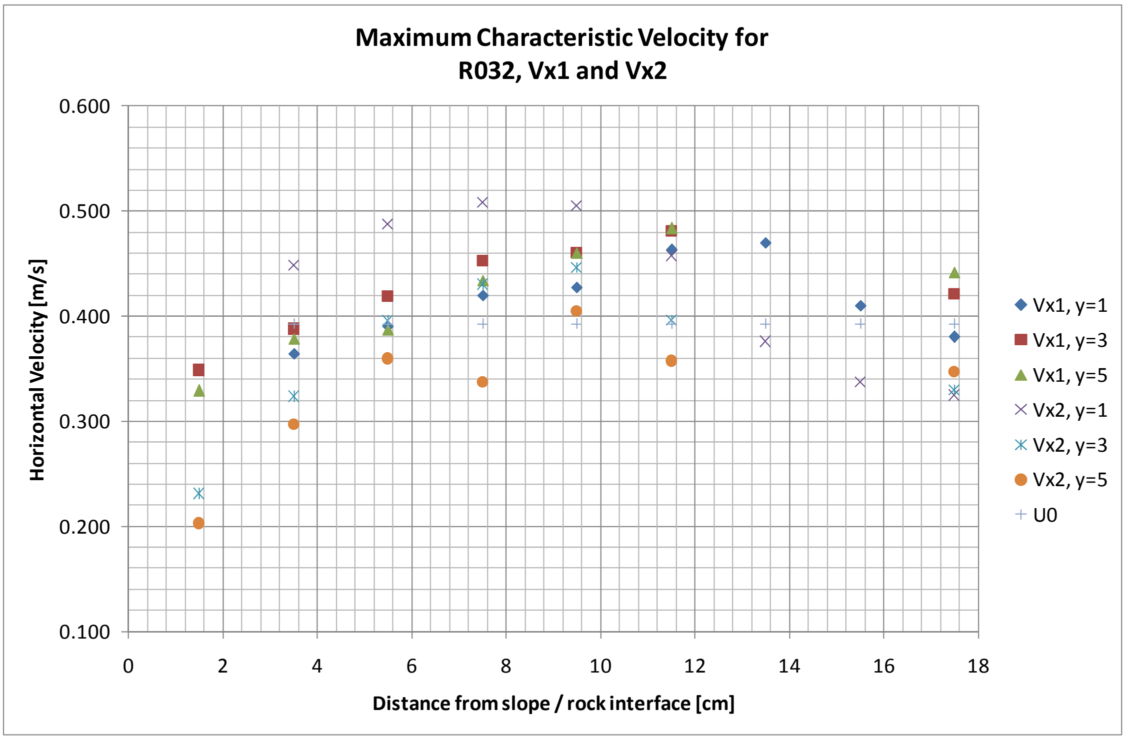


FIGURE 18 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R032

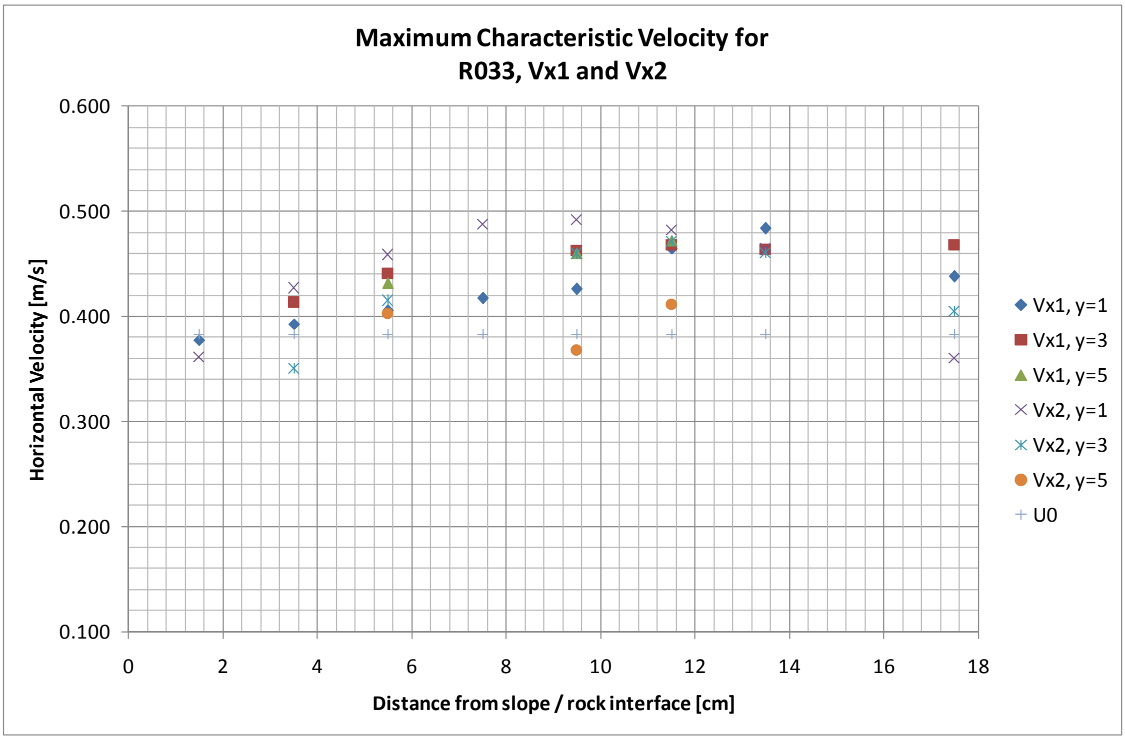


FIGURE 19 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R033

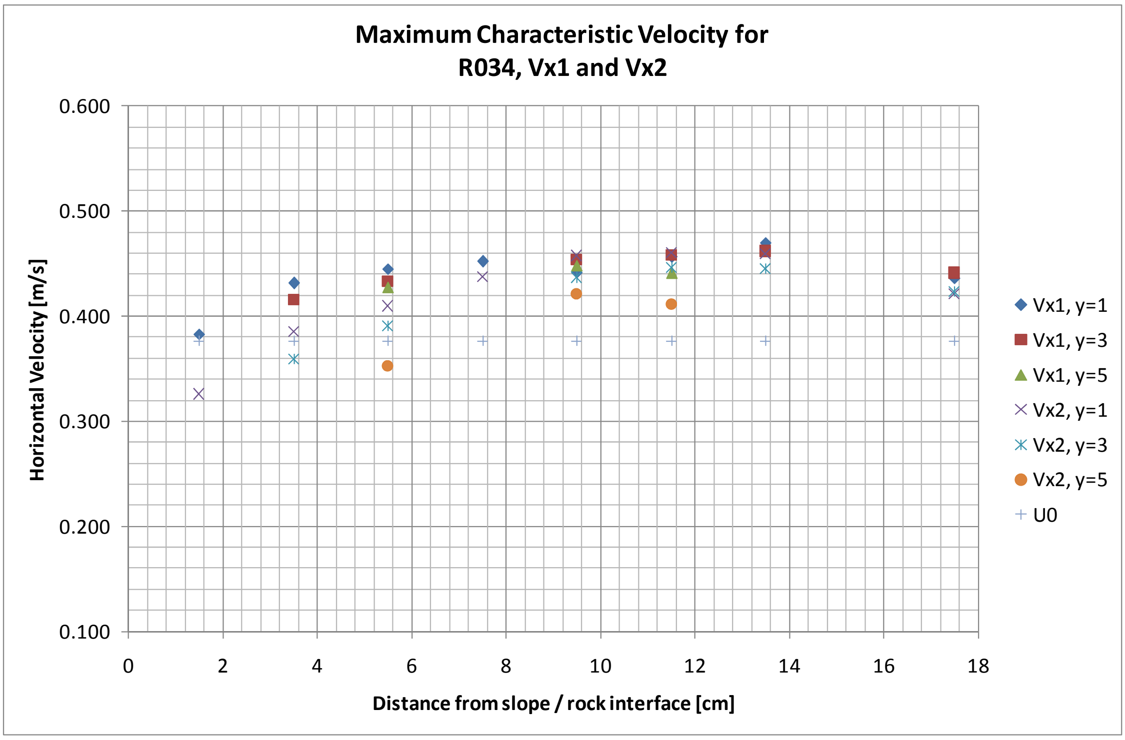


FIGURE 20 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R034

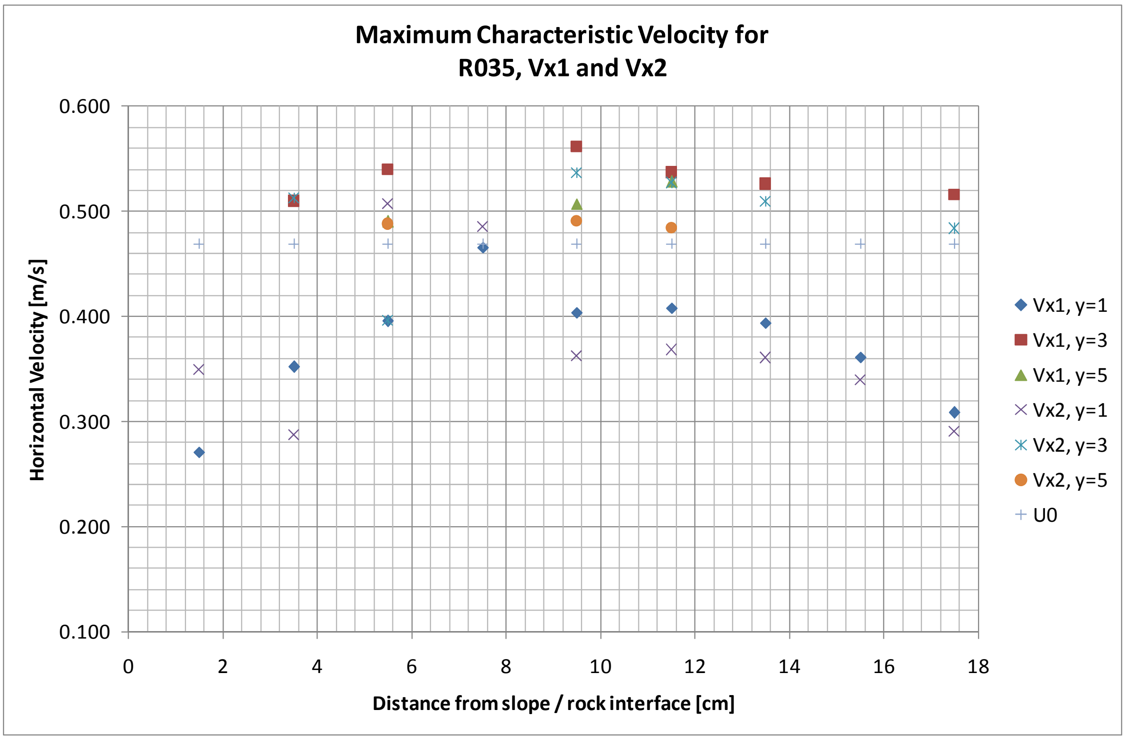


FIGURE 21 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R035

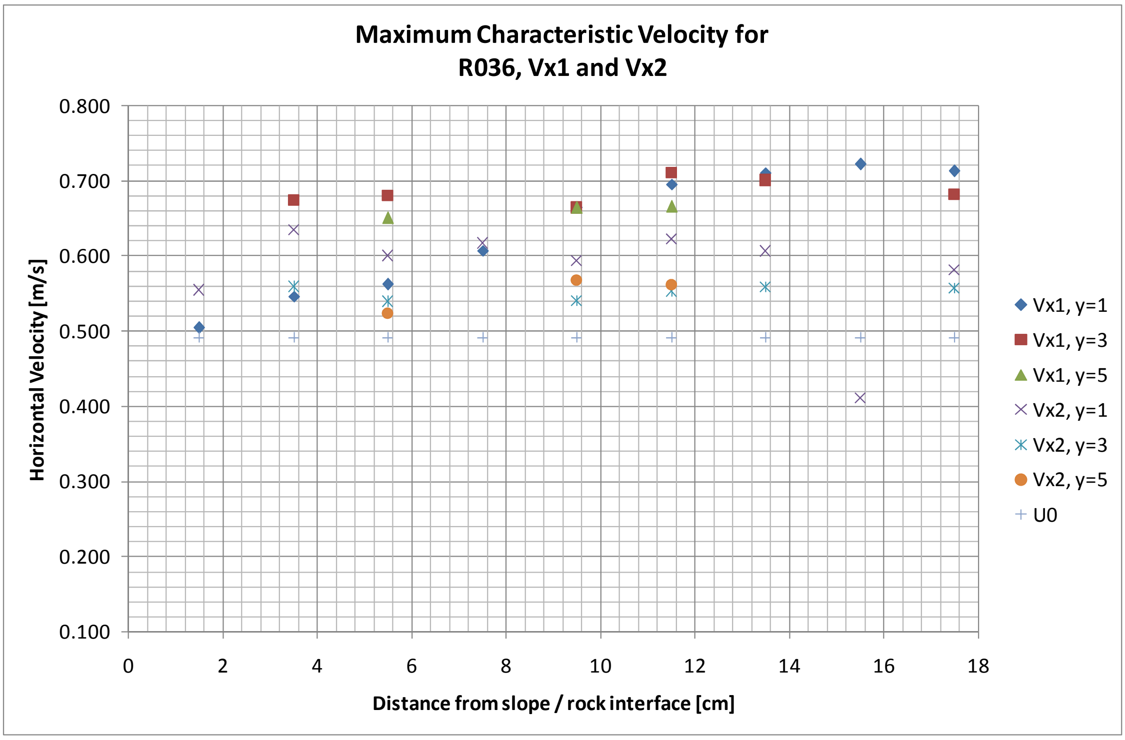


FIGURE 22 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R036

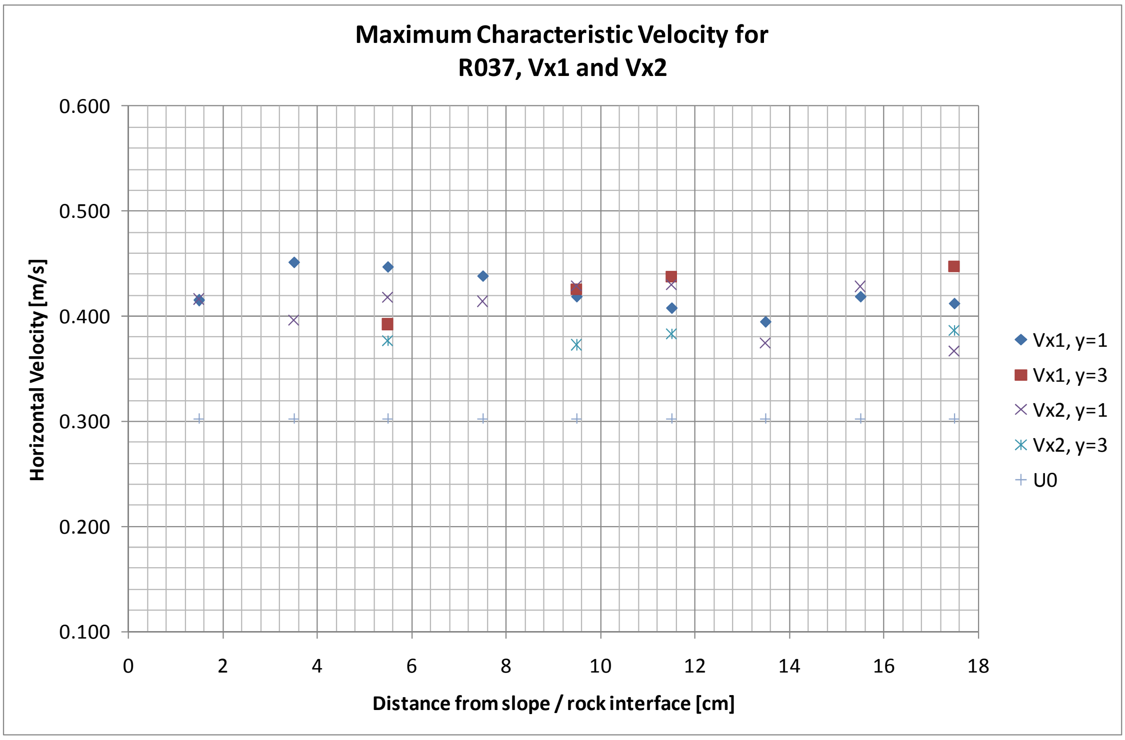


FIGURE 23 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R037

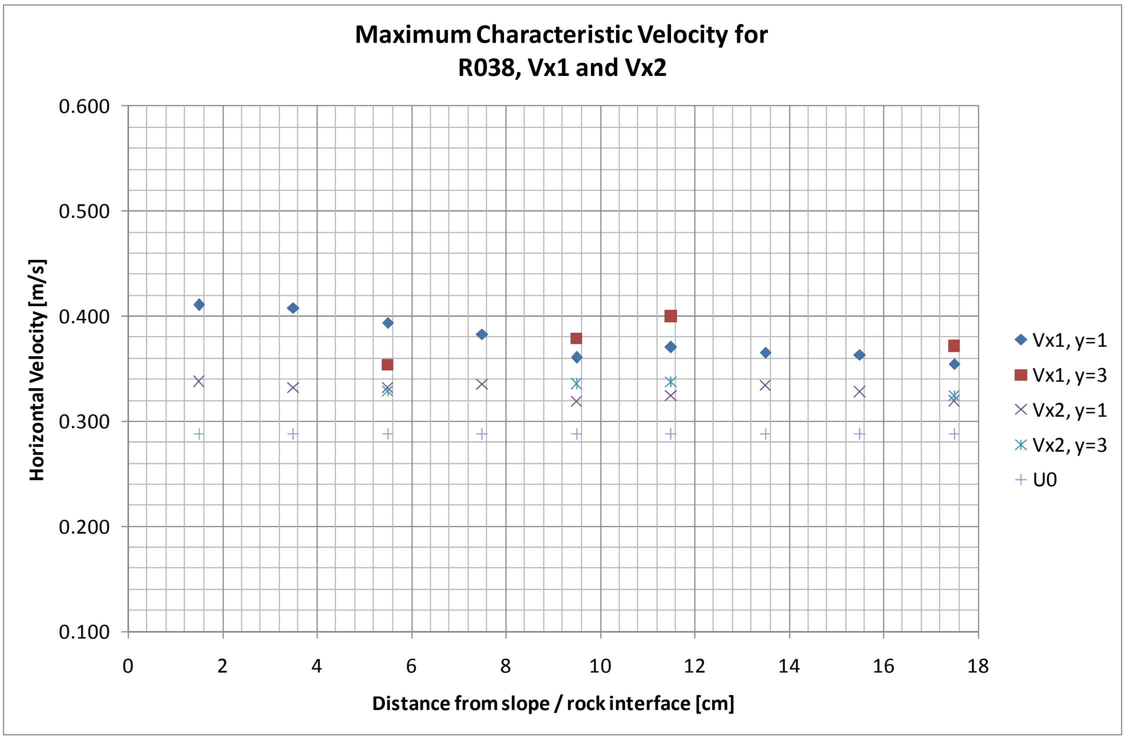


FIGURE 24 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R038

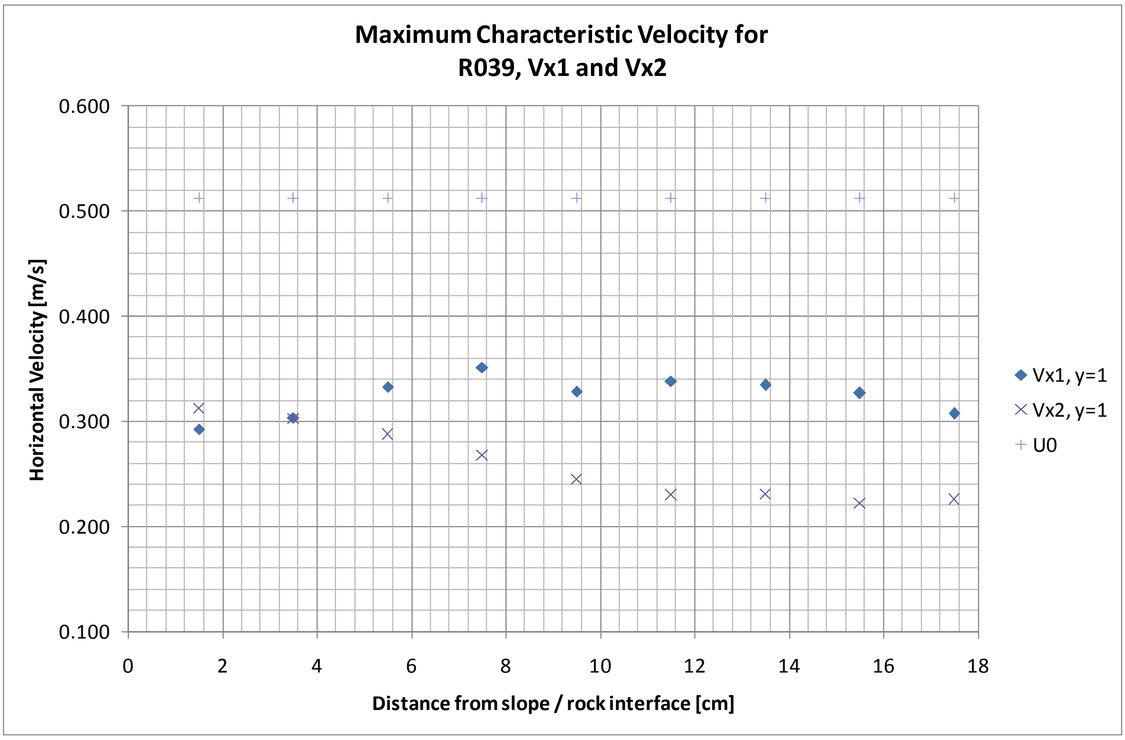


FIGURE 25 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R039

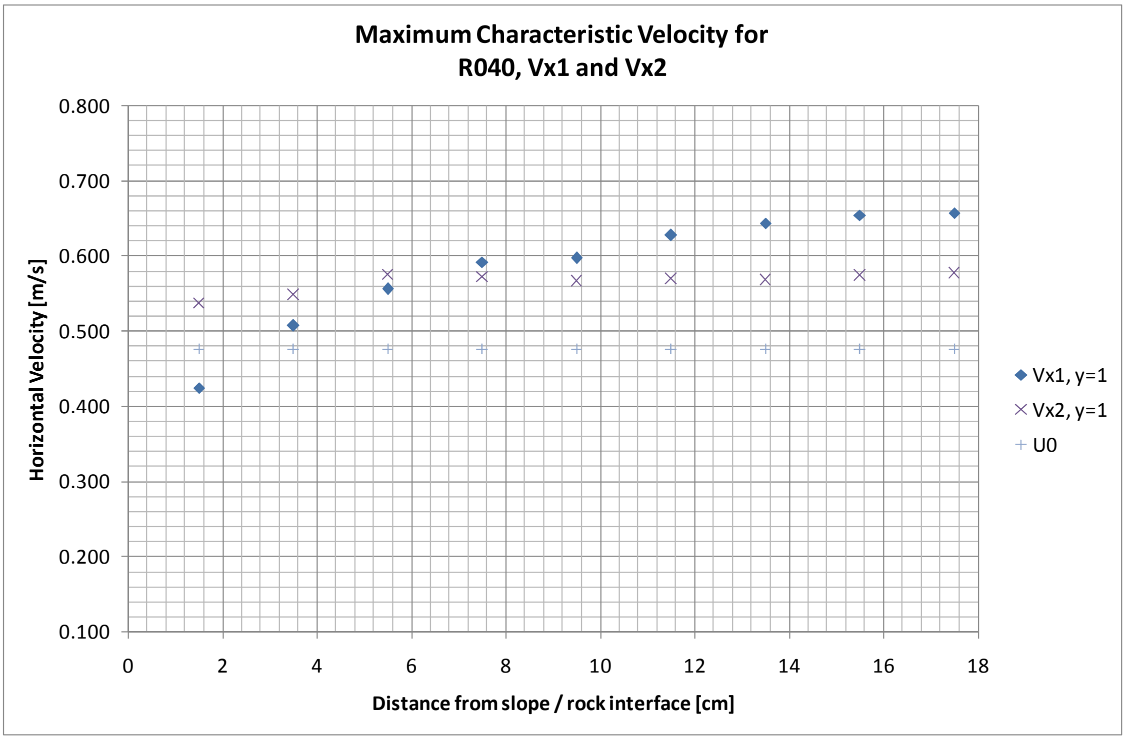


FIGURE 26 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R040

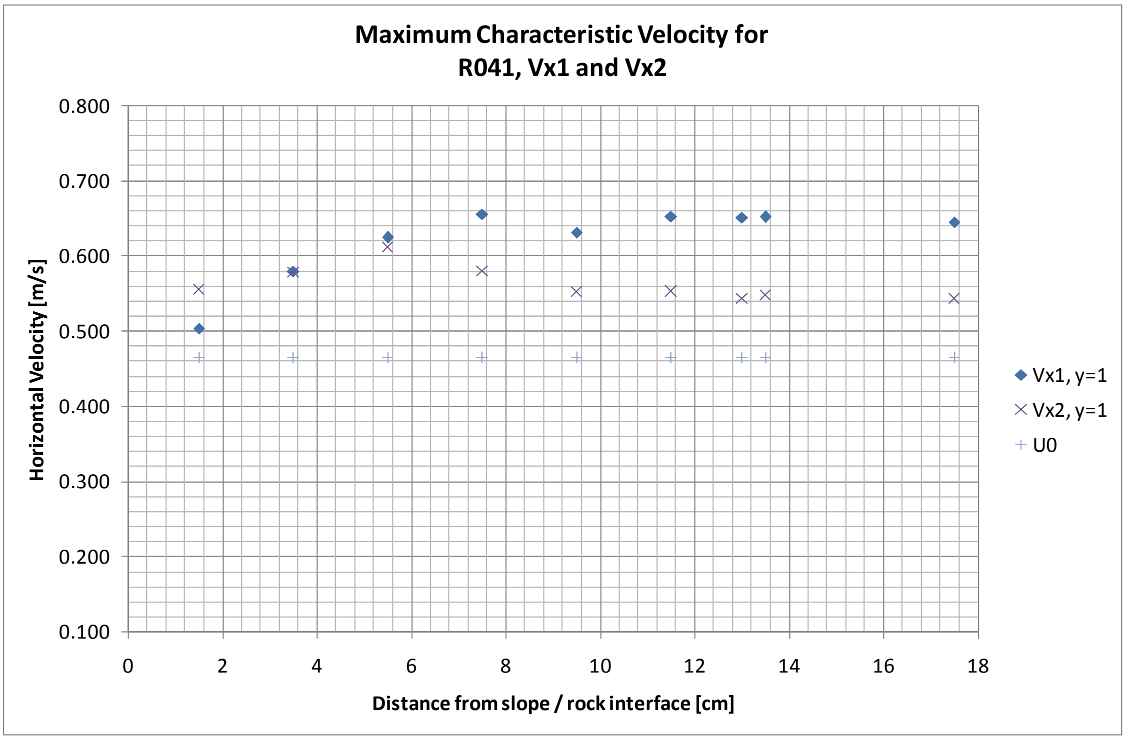


FIGURE 27 - PLOT OF MAXIMUM VELOCITY DISTRIBUTION AT TOE FOR EXPERIMENT R041