Control of Voice coil transducers

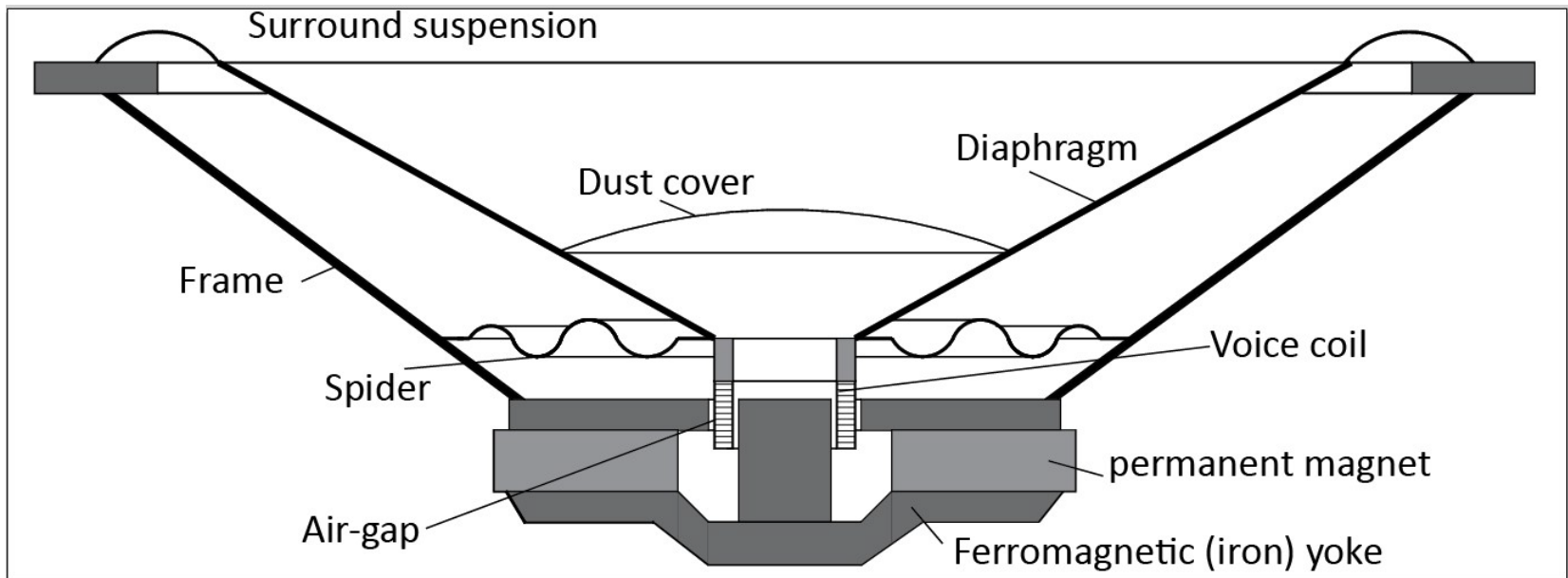Design and implementation of a Motional Feedback Loudspeaker Woofer

Overview

- Introduction to loudspeakers
- Objective
- Setup 1
- Results 1
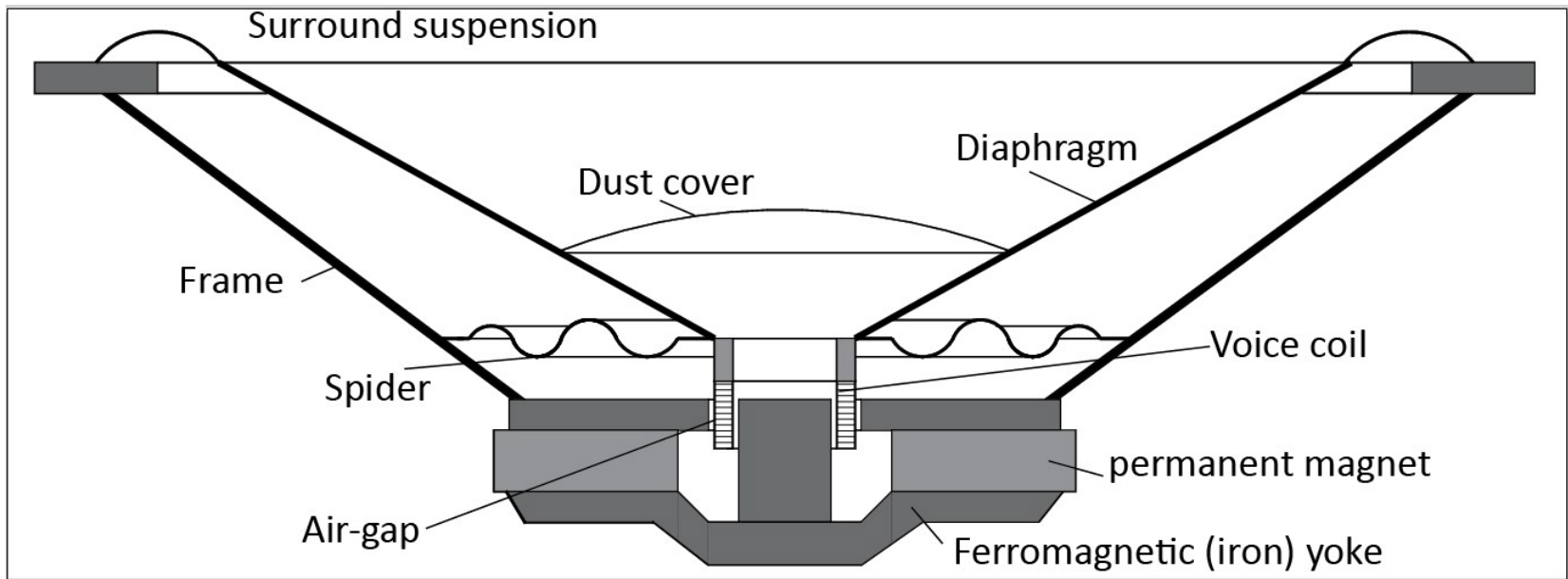- Setup 2
- Results 2
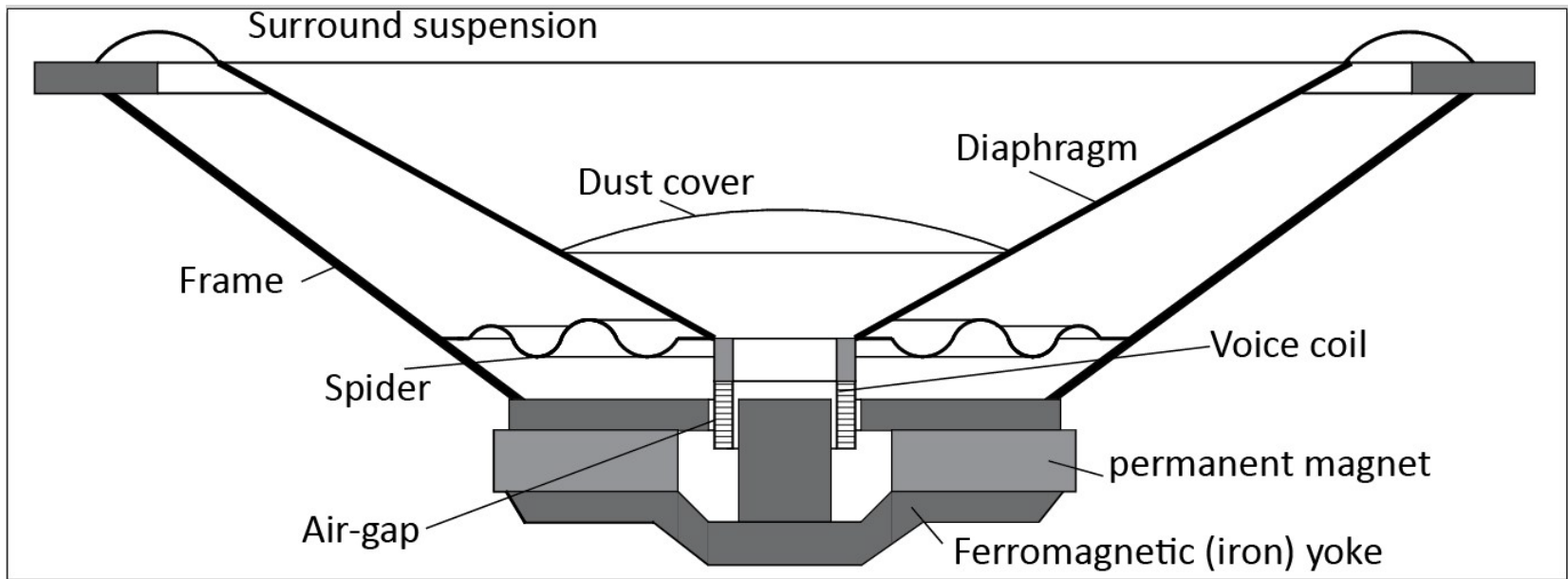- Conclusion
- Questions

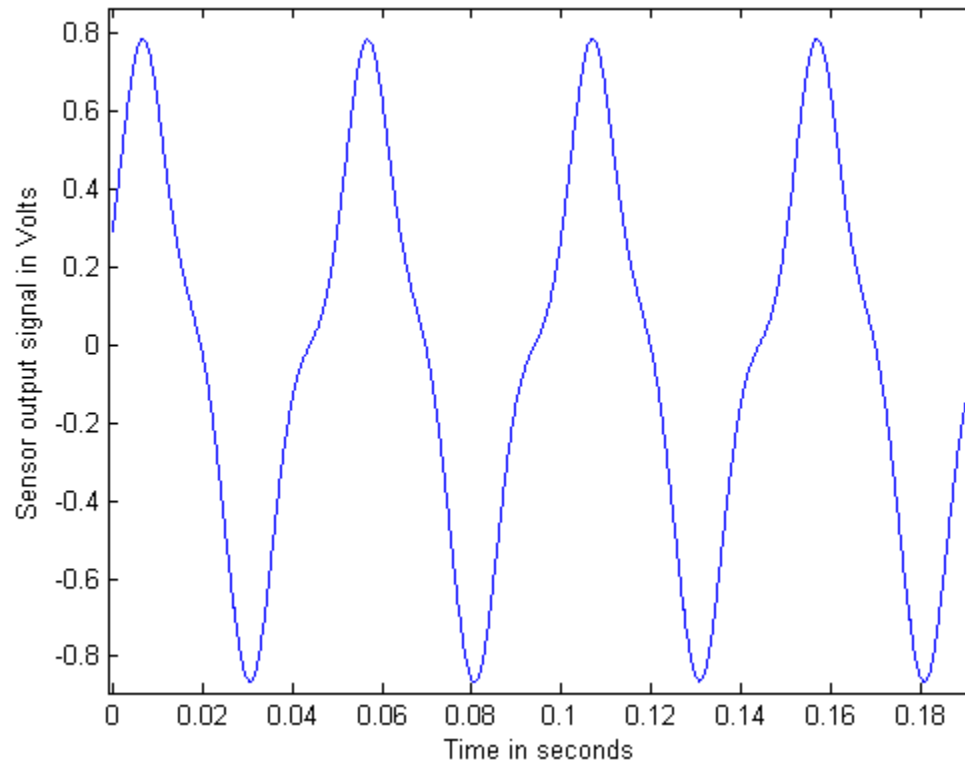# Introduction to loudspeakers

TUDelft

Introduction to loudspeakers

Introduction to loudspeakers

Labels on the diagram: Surround suspension, Diaphragm, Dust cover, Frame, Voice coil, Spider, permanent magnet, Air-gap, Ferromagnetic (iron) yoke
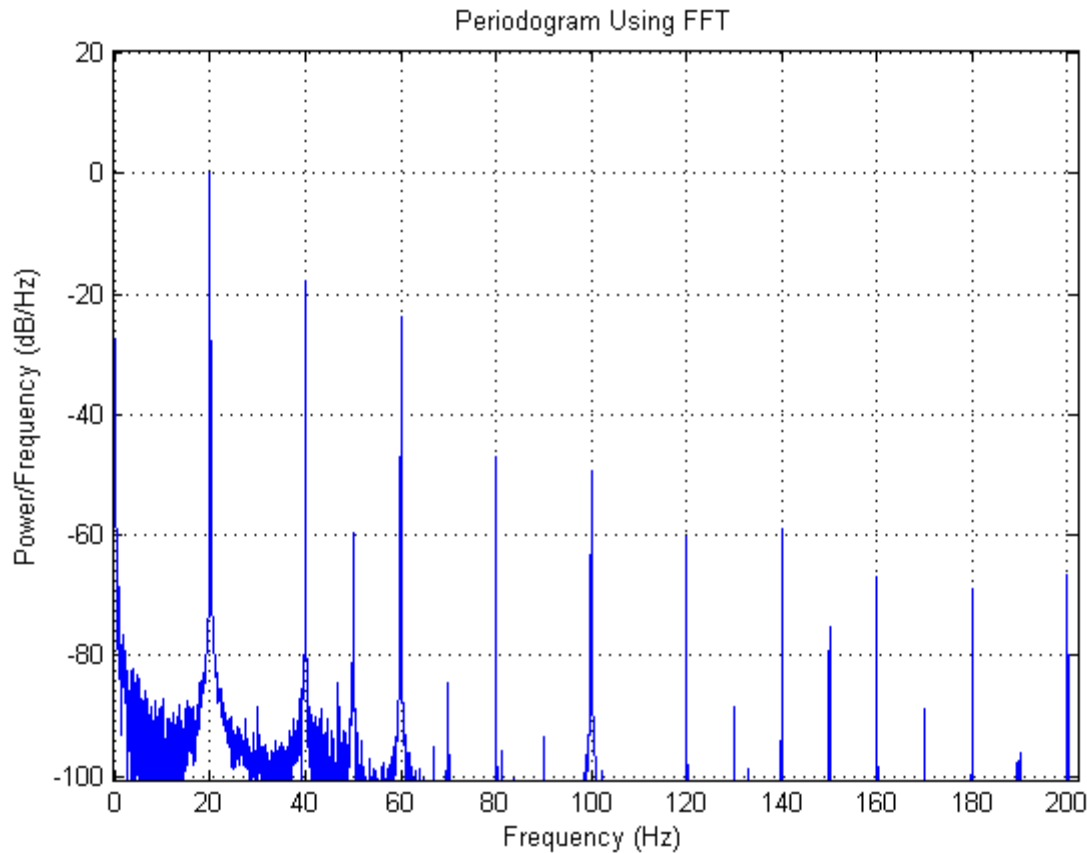
TUDelft

Introduction to loudspeakers

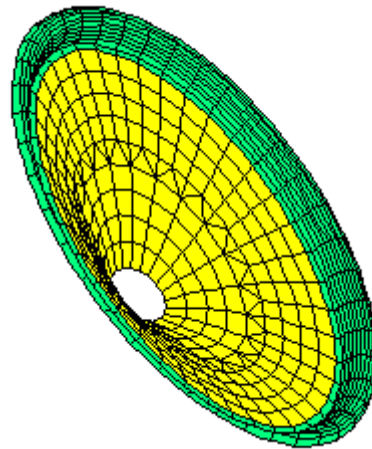# Introduction to loudspeakers

TUDelft

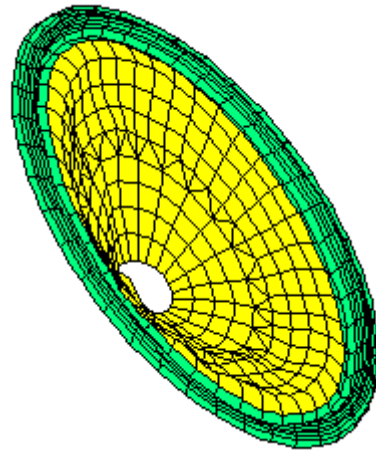# Introduction to loudspeakers

Introduction to loudspeakers

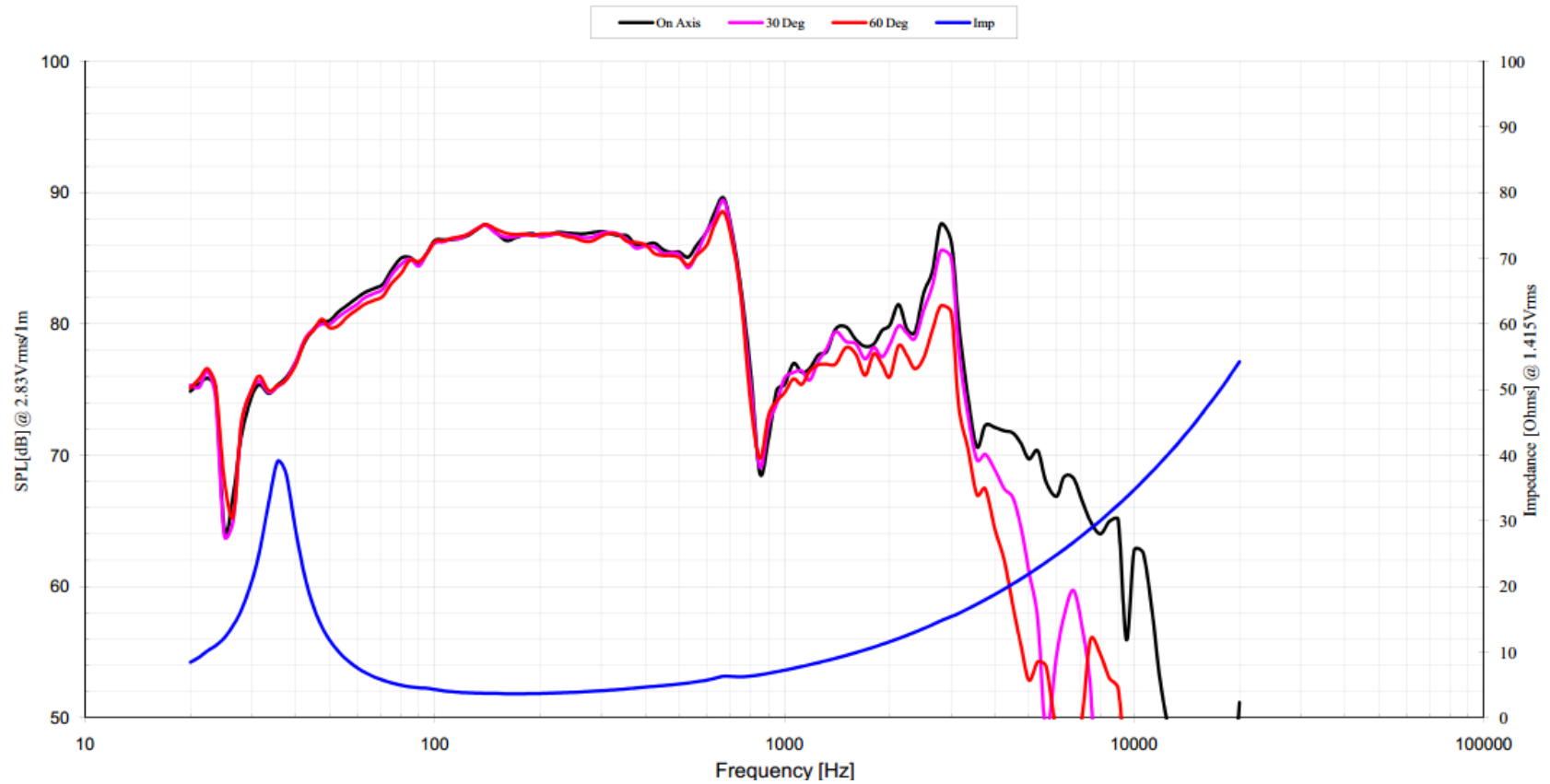PACSYS

TUDelft

Introduction to loudspeakers

PACSYS

Objective

- Suppress disturbances due to non-linearities
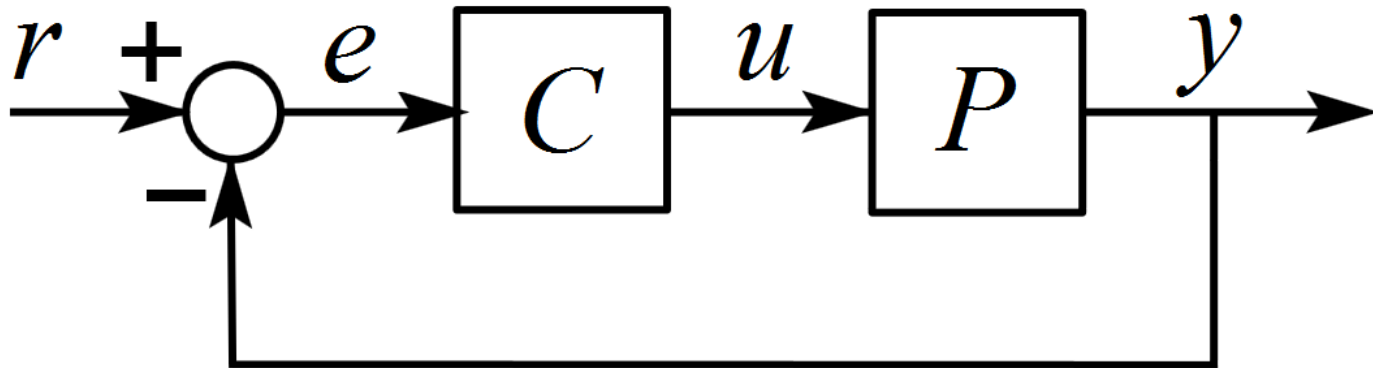- Reduce the cone break-up

Setup 1

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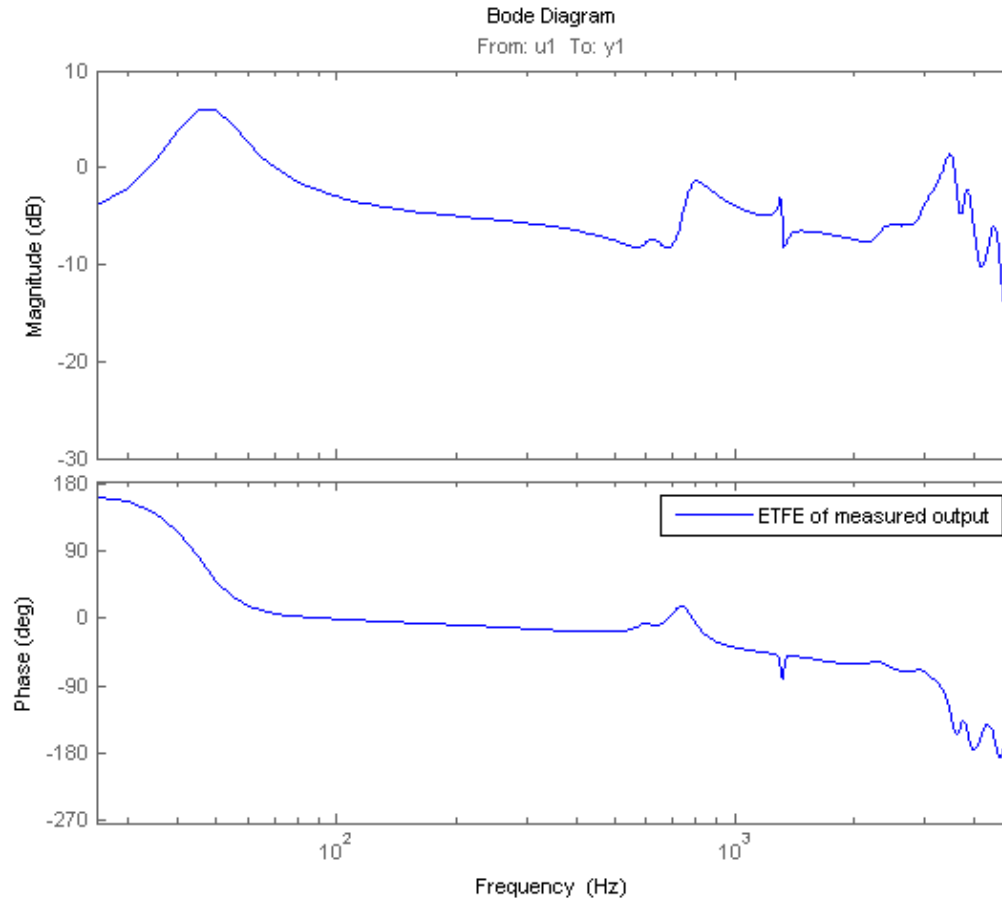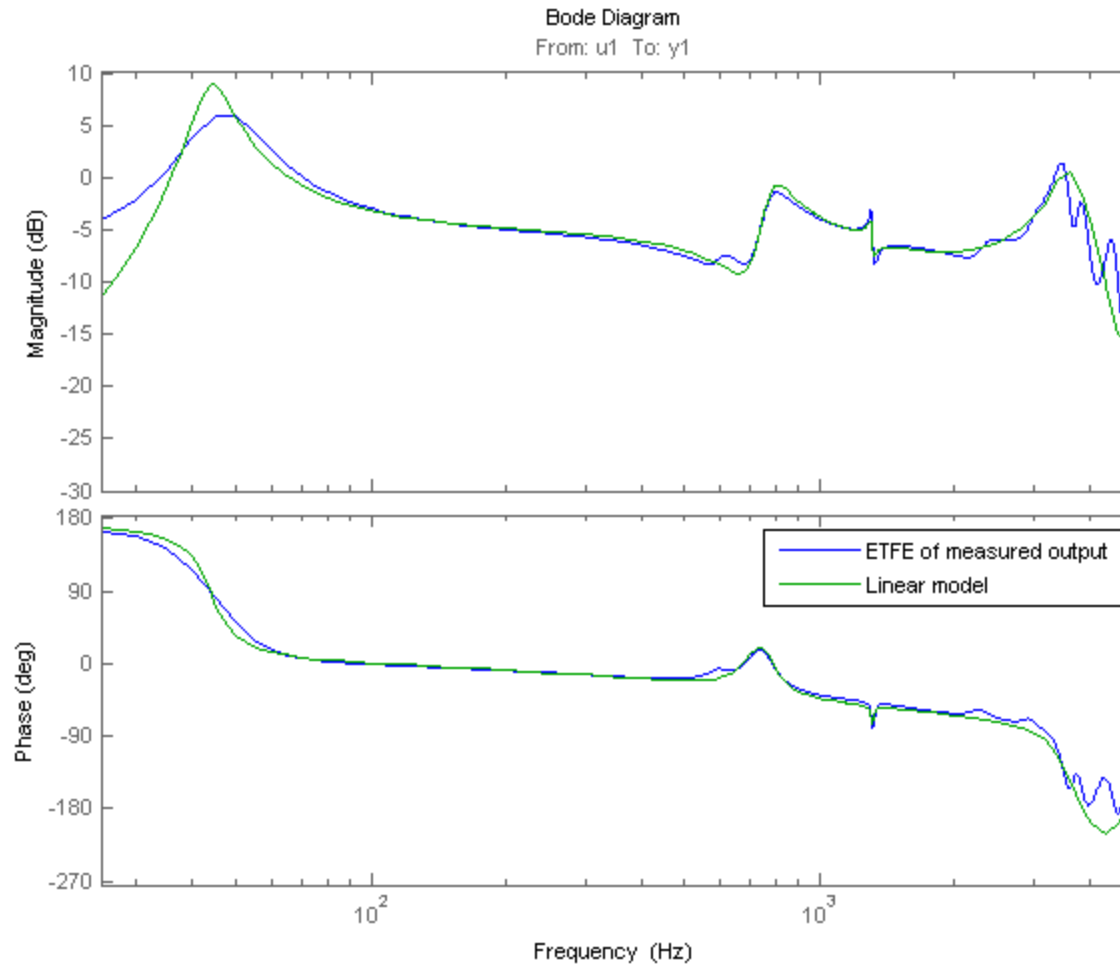# Setup 1

Setup 1

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Setup 1

- Reference signal
- Implementation of controller
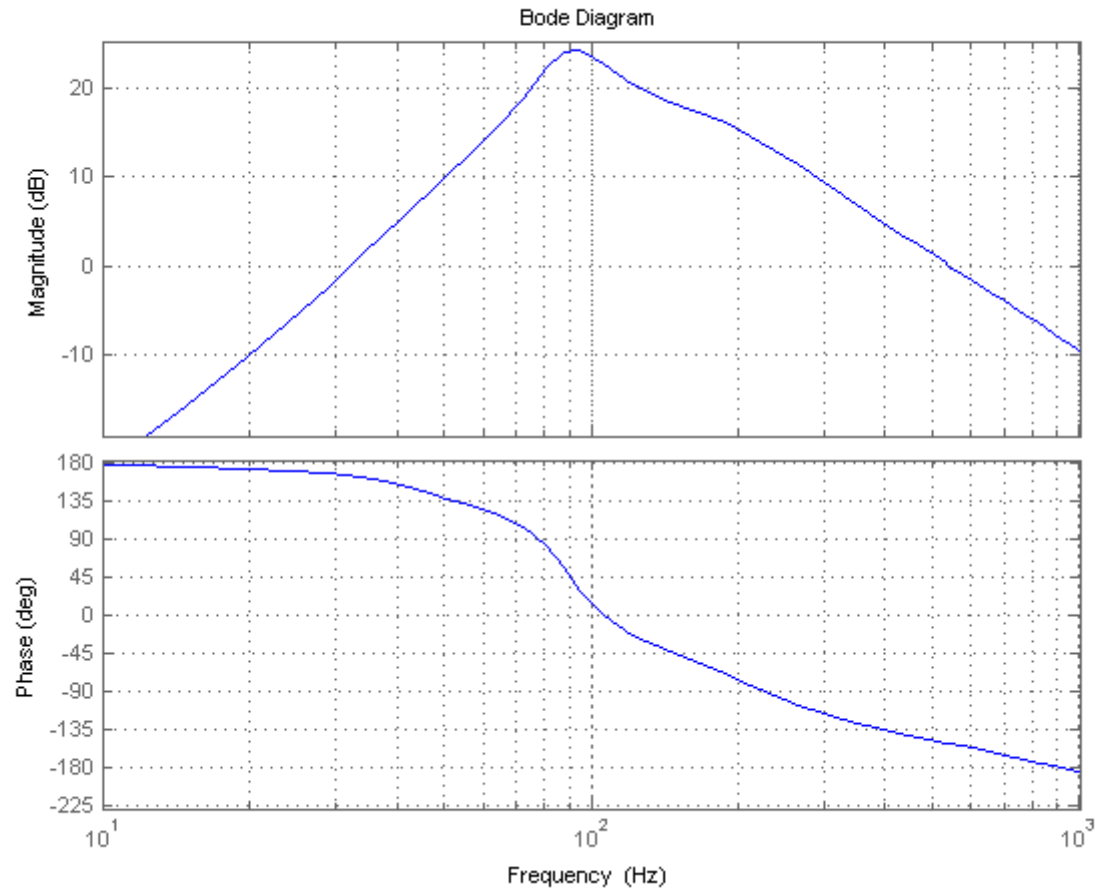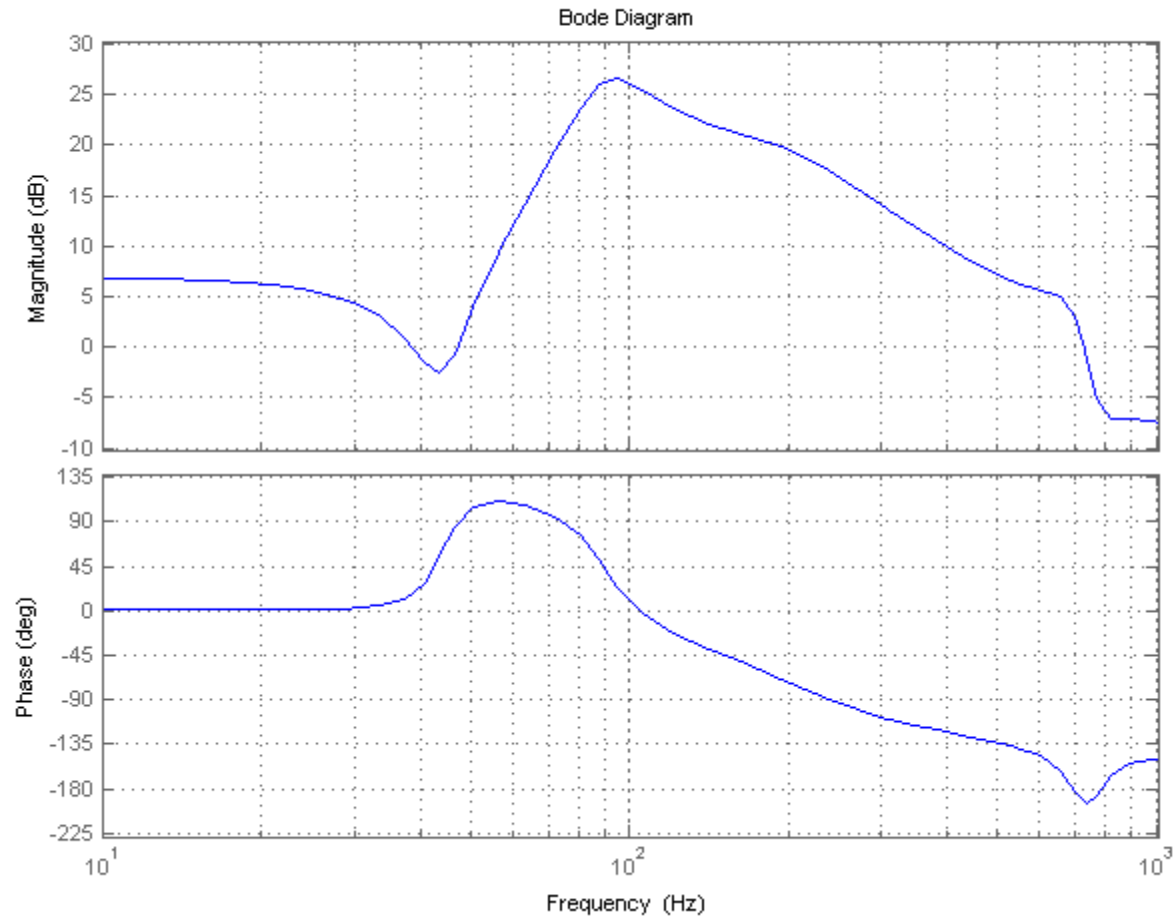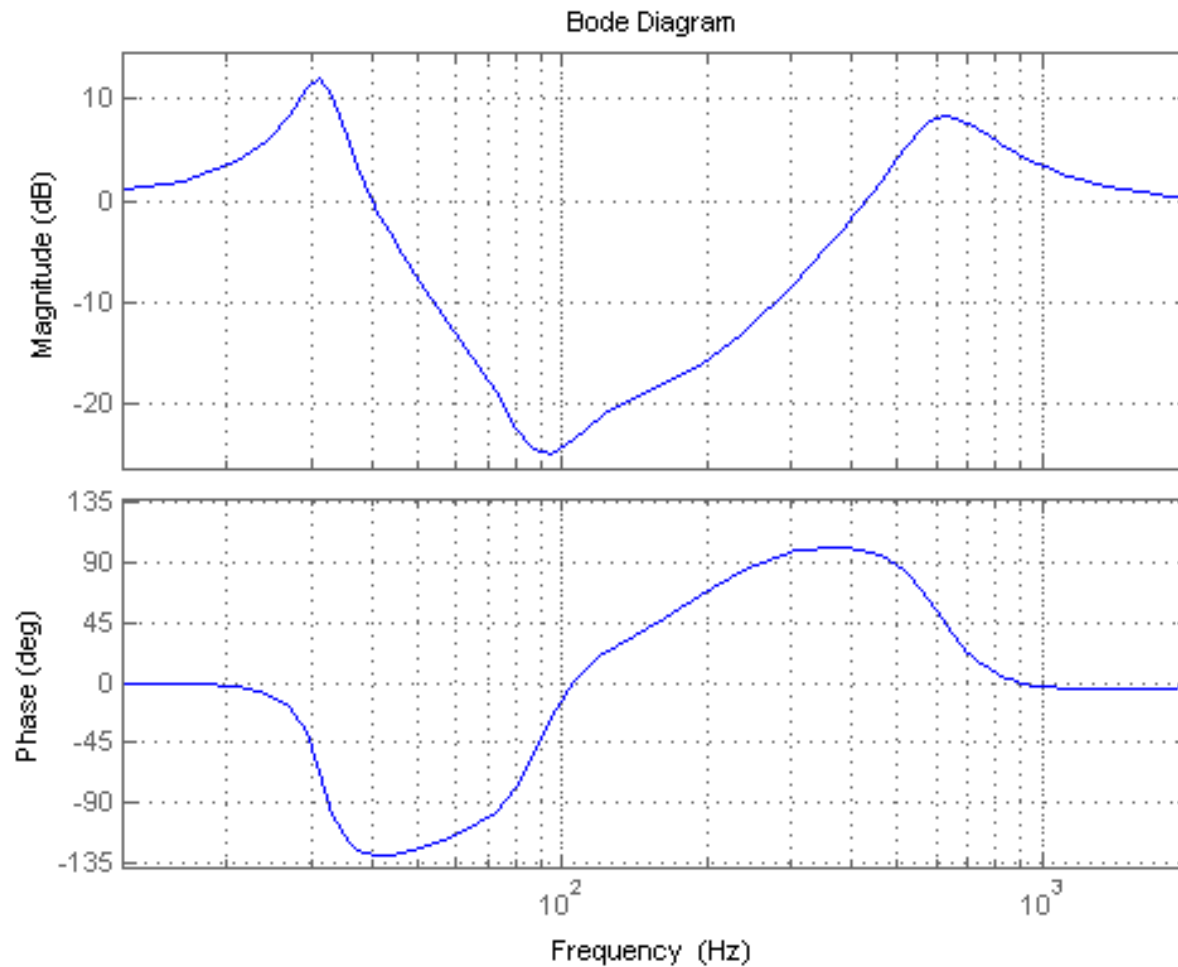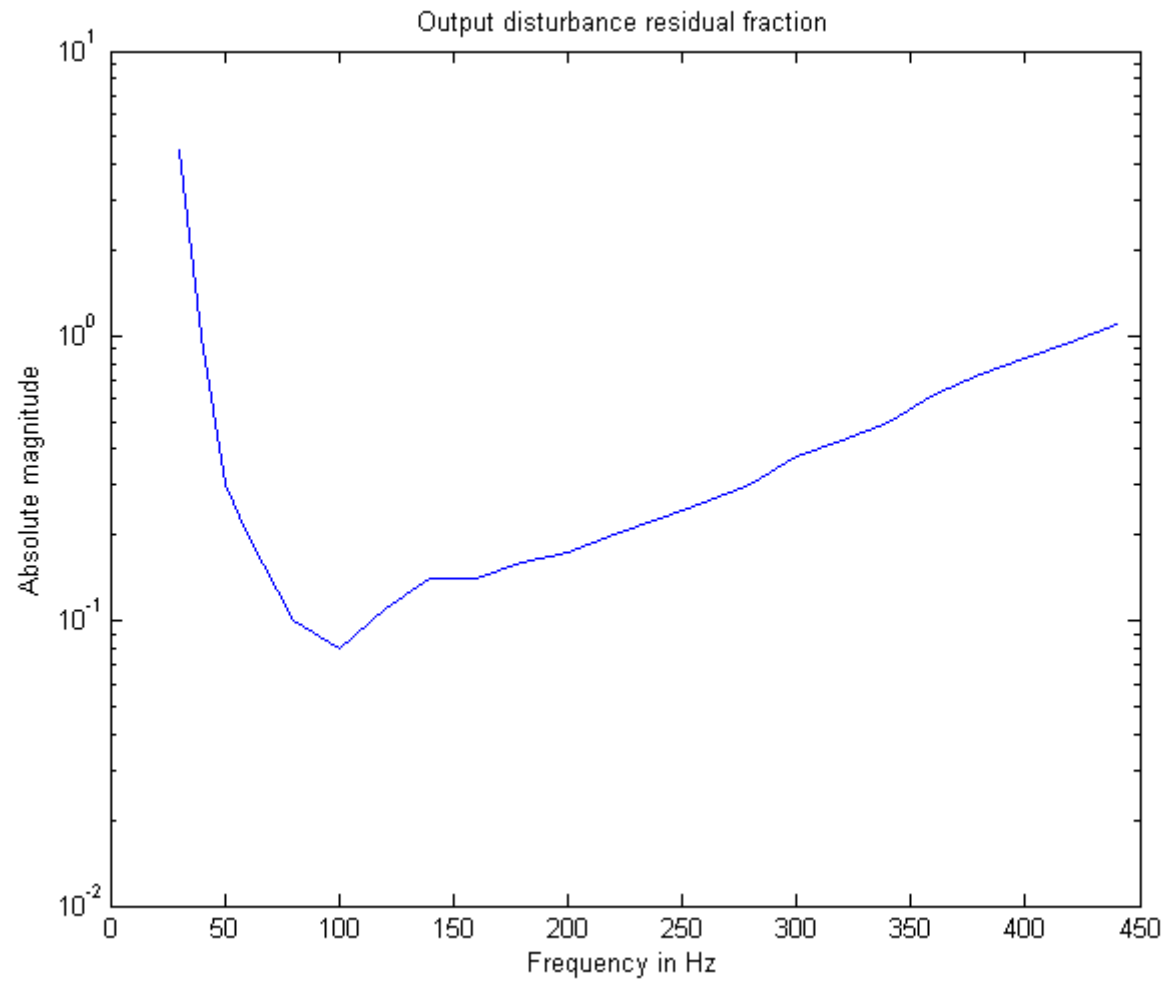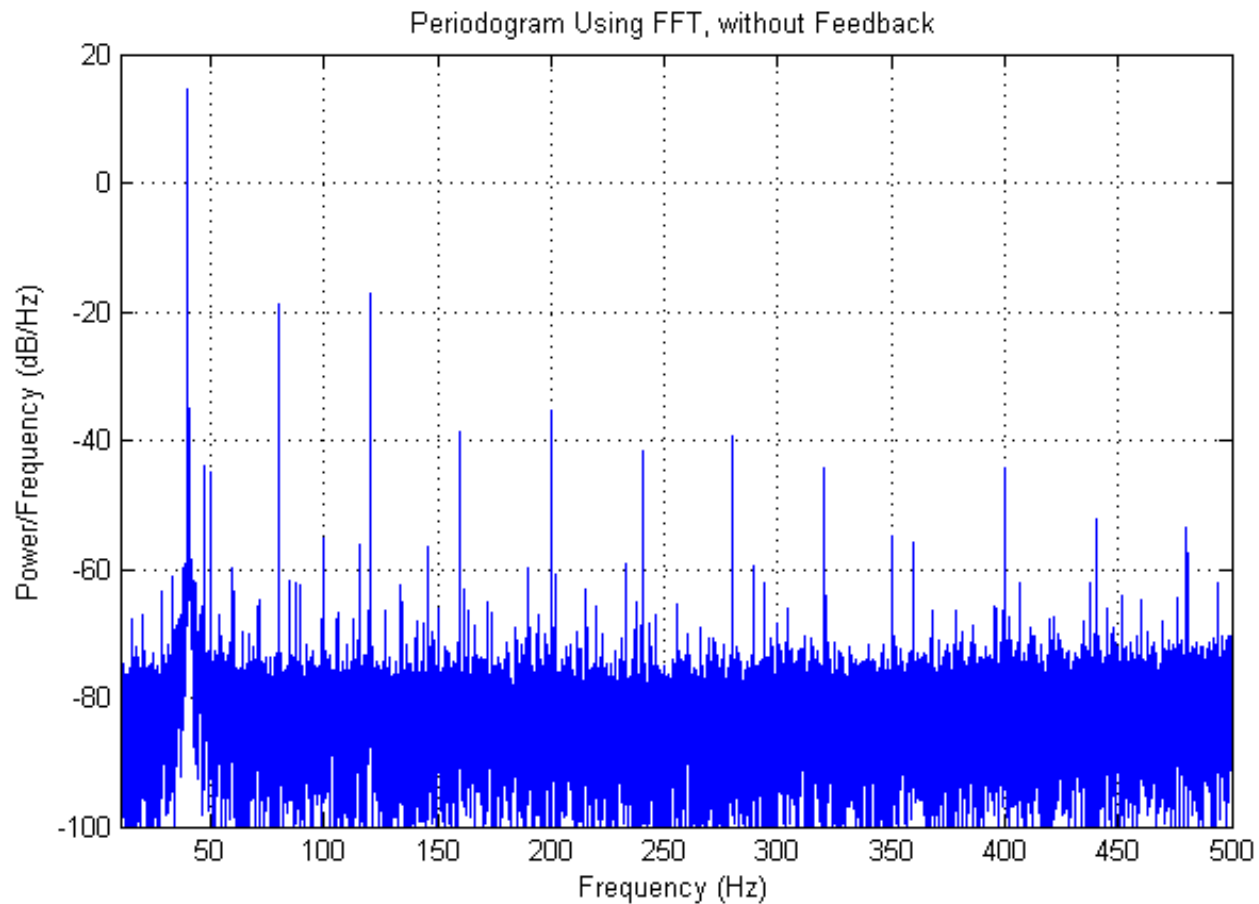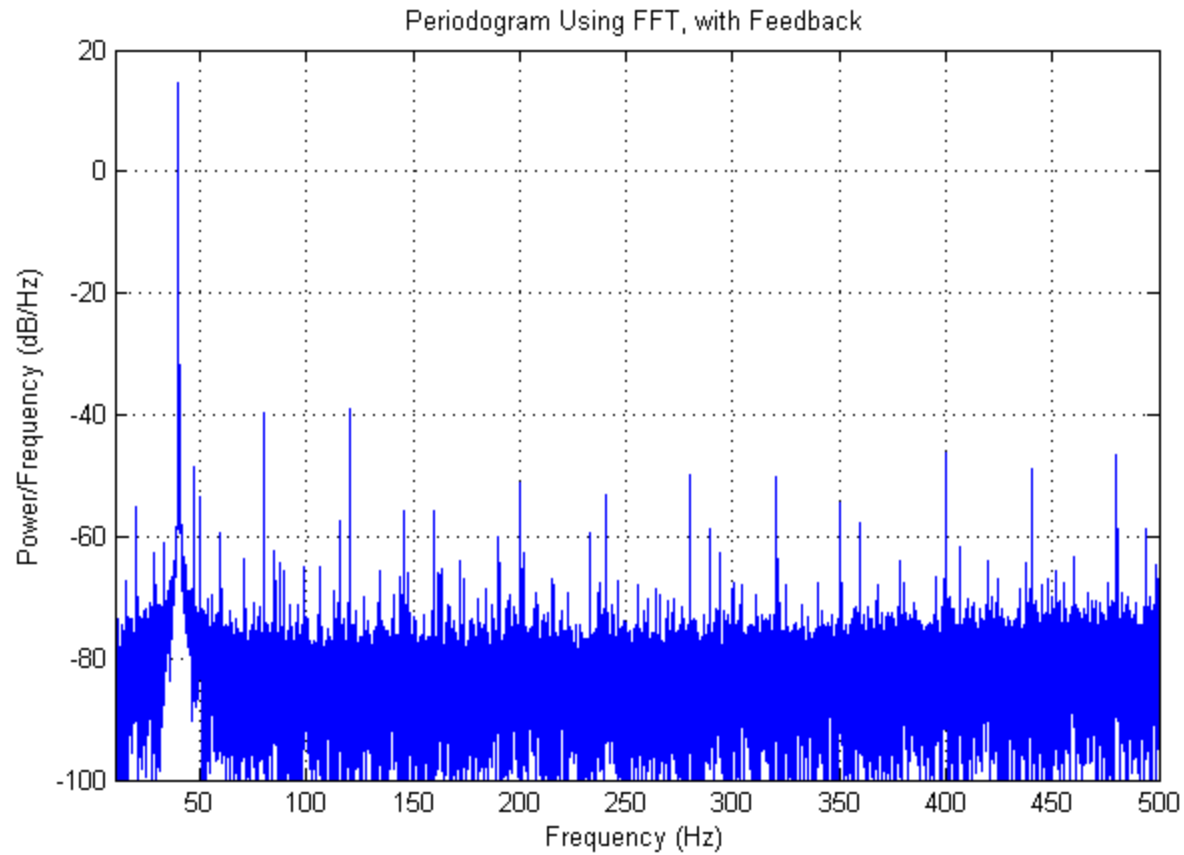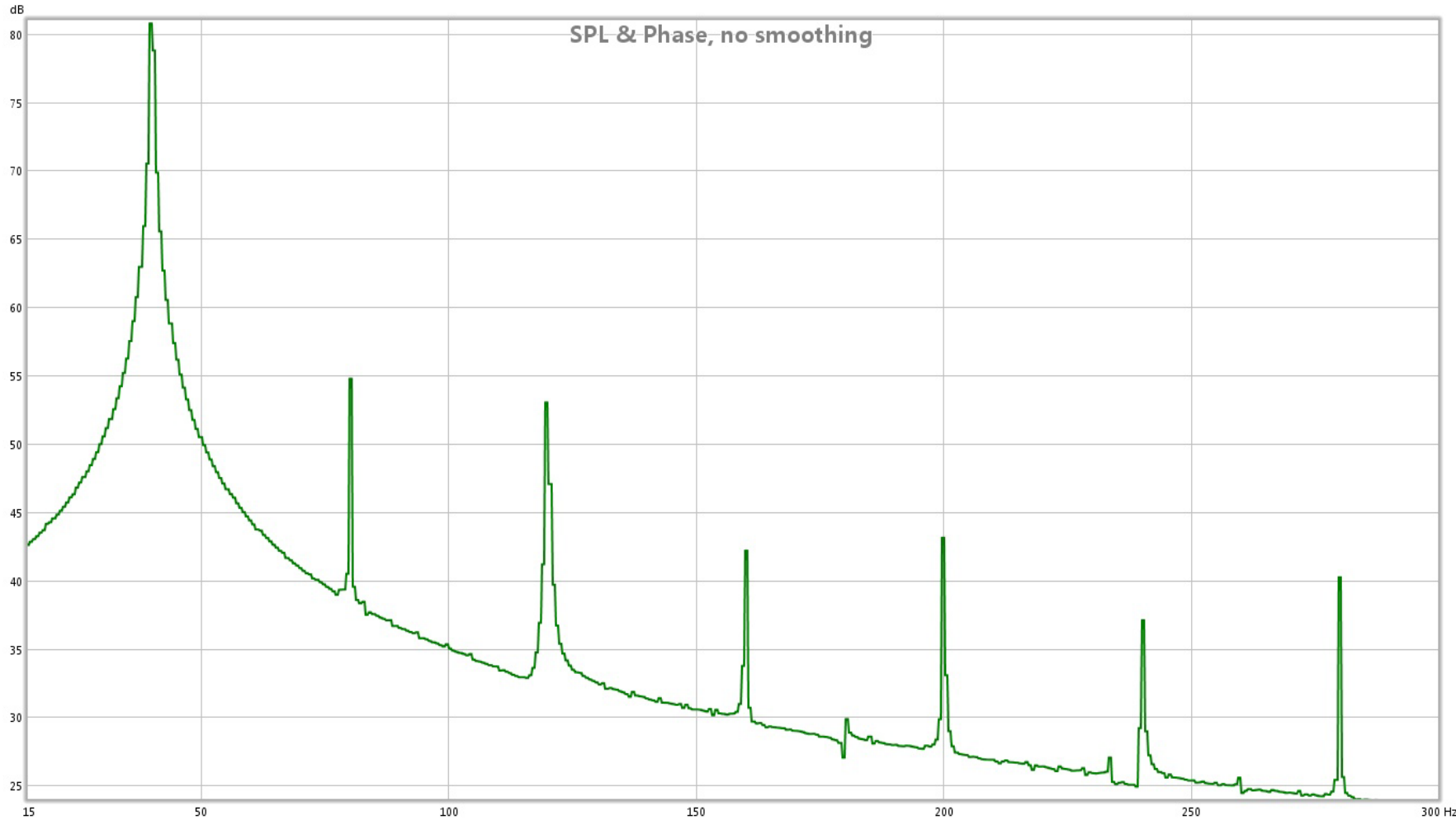- Measure the motion of woofer

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Setup 1

Bode Diagram
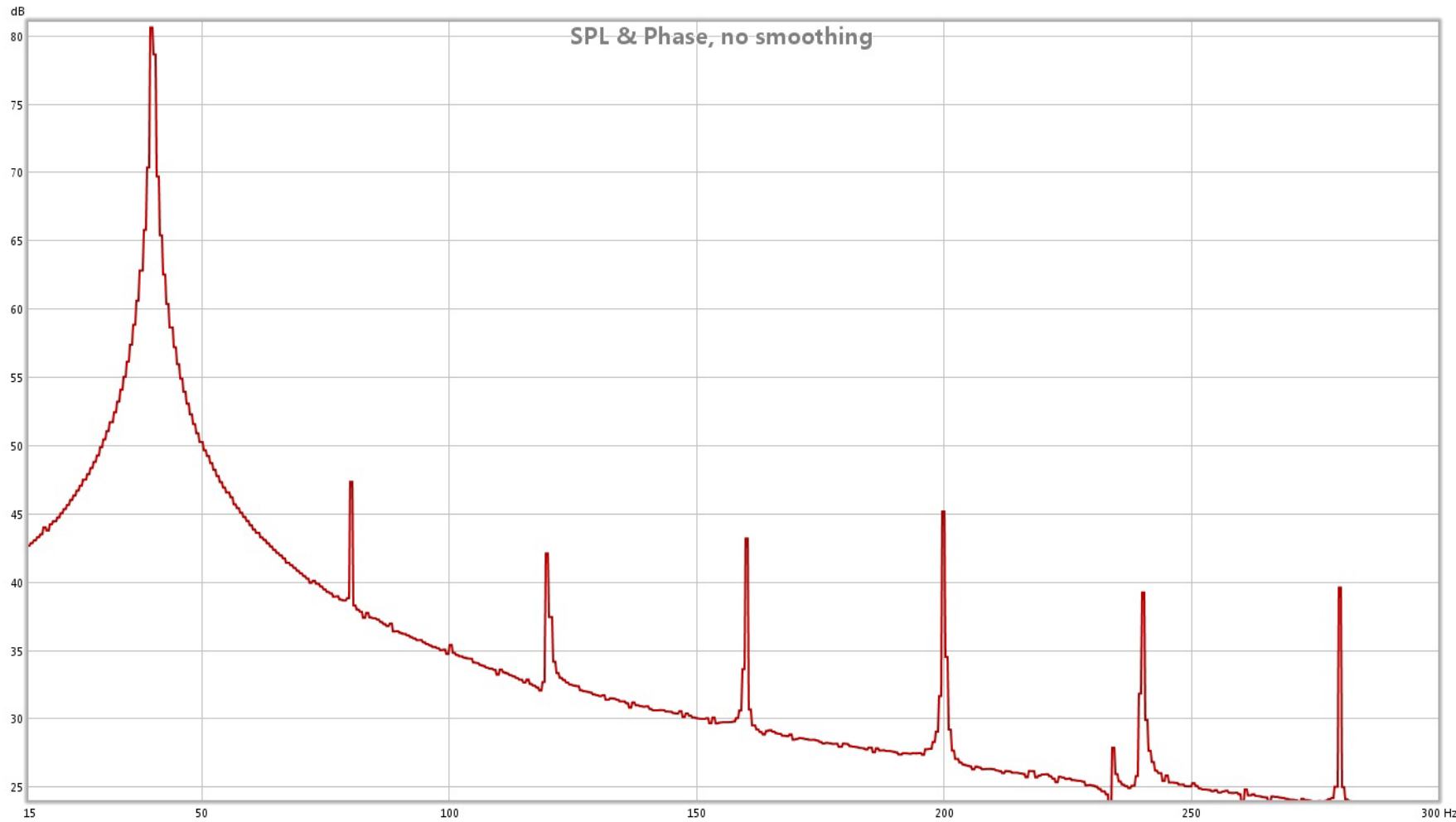From: u1 To: y1

Setup 1

Setup 1

Setup 1

Setup 1

Setup 1

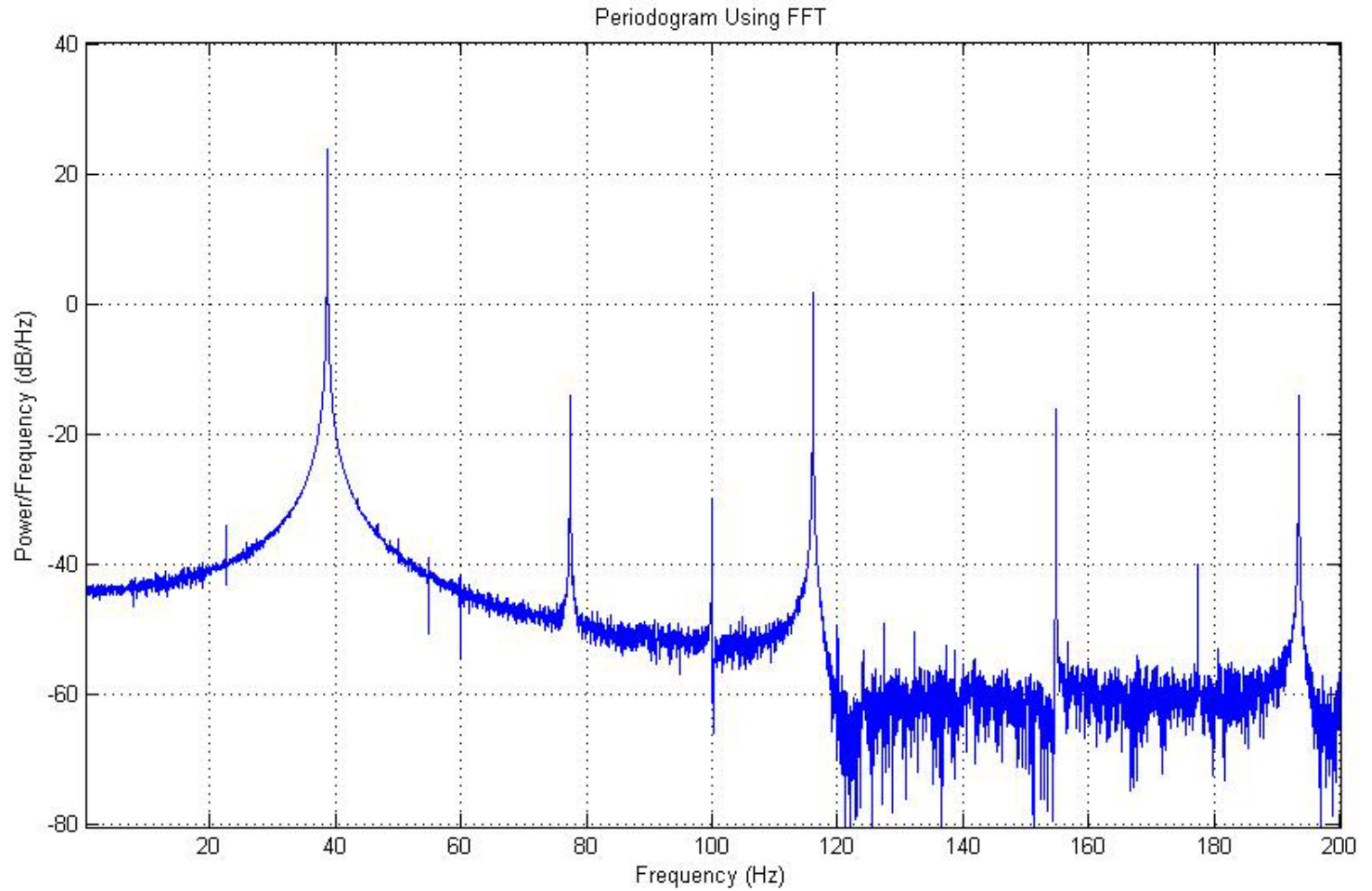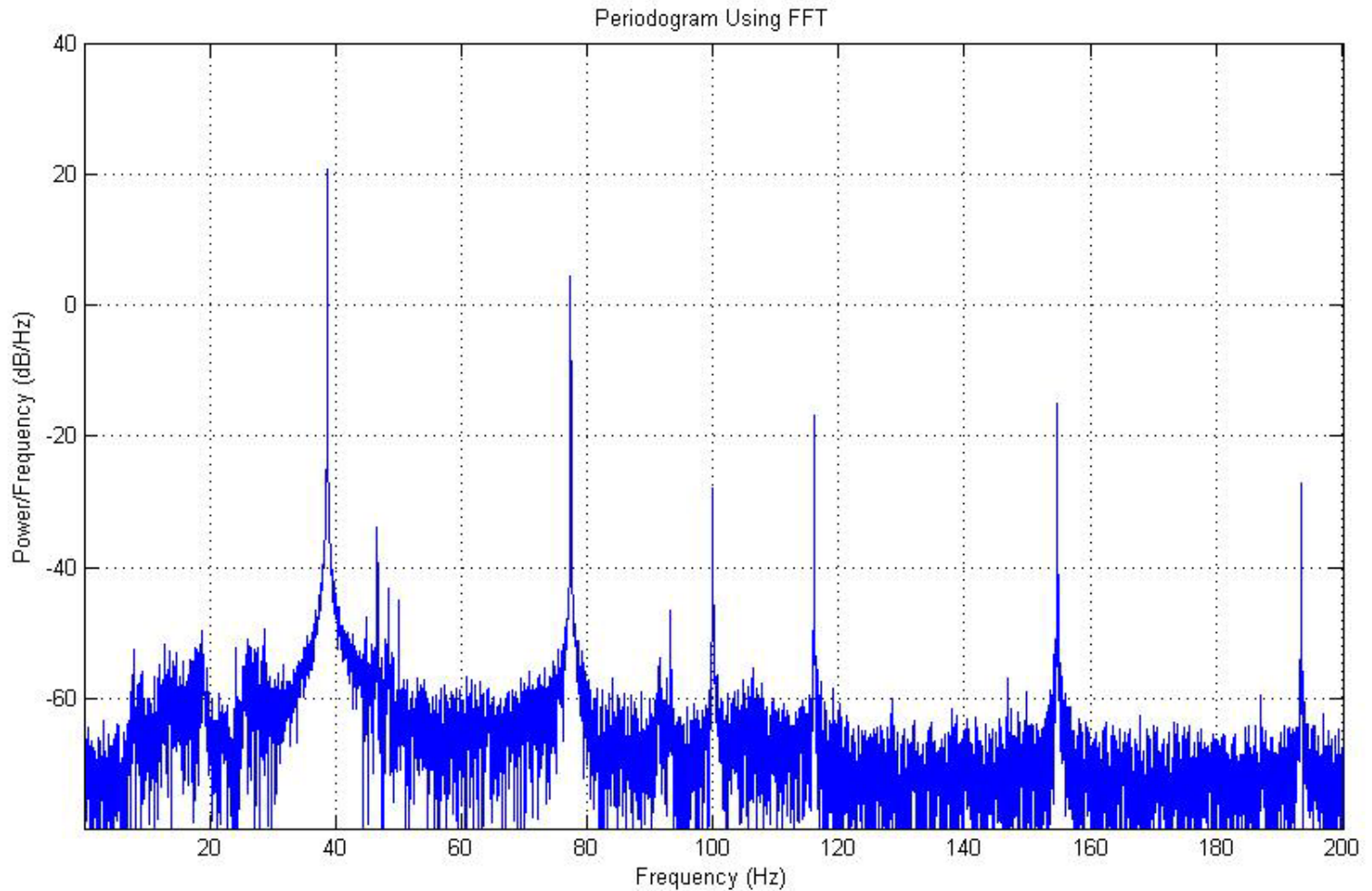
Output disturbance residual fraction

T̆U Delft

Setup 1

Periodogram Using FFT, without Feedback

TUDelft

Setup 1

Periodogram Using FFT, with Feedback

Setup 1

Setup 1

SPL & Phase, no smoothing

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Setup 1

Periodogram Using FFT

T̃U Delft

Setup 1

Periodogram Using FFT

TUDelft

Setup 1

- Outer ring of cone still add distortion
- "Better" cones gain more from a feedback loop

TUDelft

Setup 1

- Suppress disturbances due to non-linearities
- Reduce the cone break-up