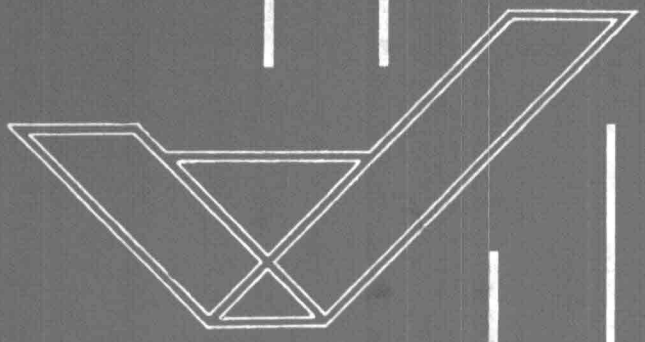


GETIJ ANALYSE EN VOORSPELLINGEN M.B.V. ARIMA-MODELLEN

- figuren -

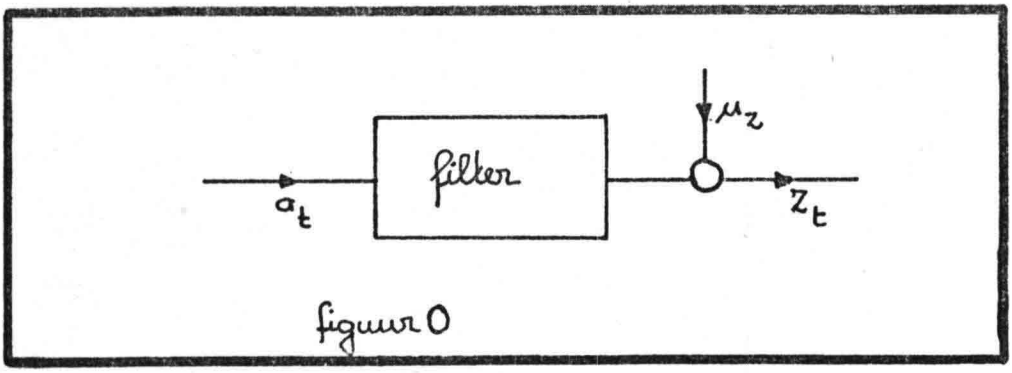
S.A.P.J. Hendriksen

september 1981

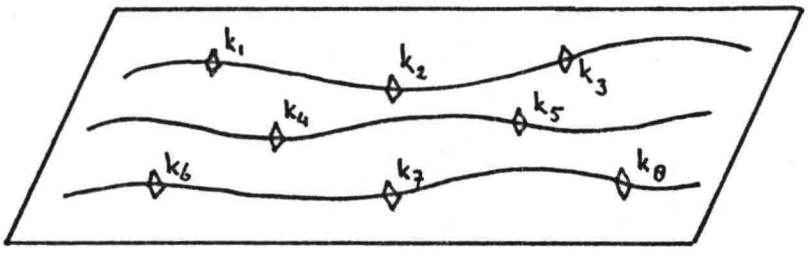
Vakgroep: Vloeistofmechanica

Docent: prof.dr.ir.J.P.Th.Kalkwijk

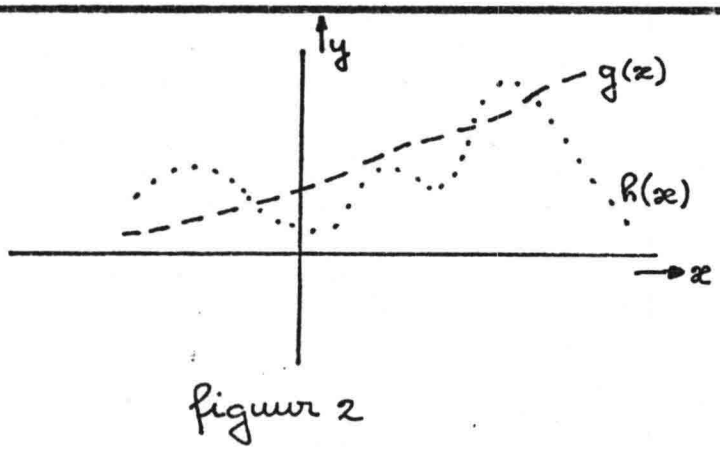
Publikatie no: R/1981/161D



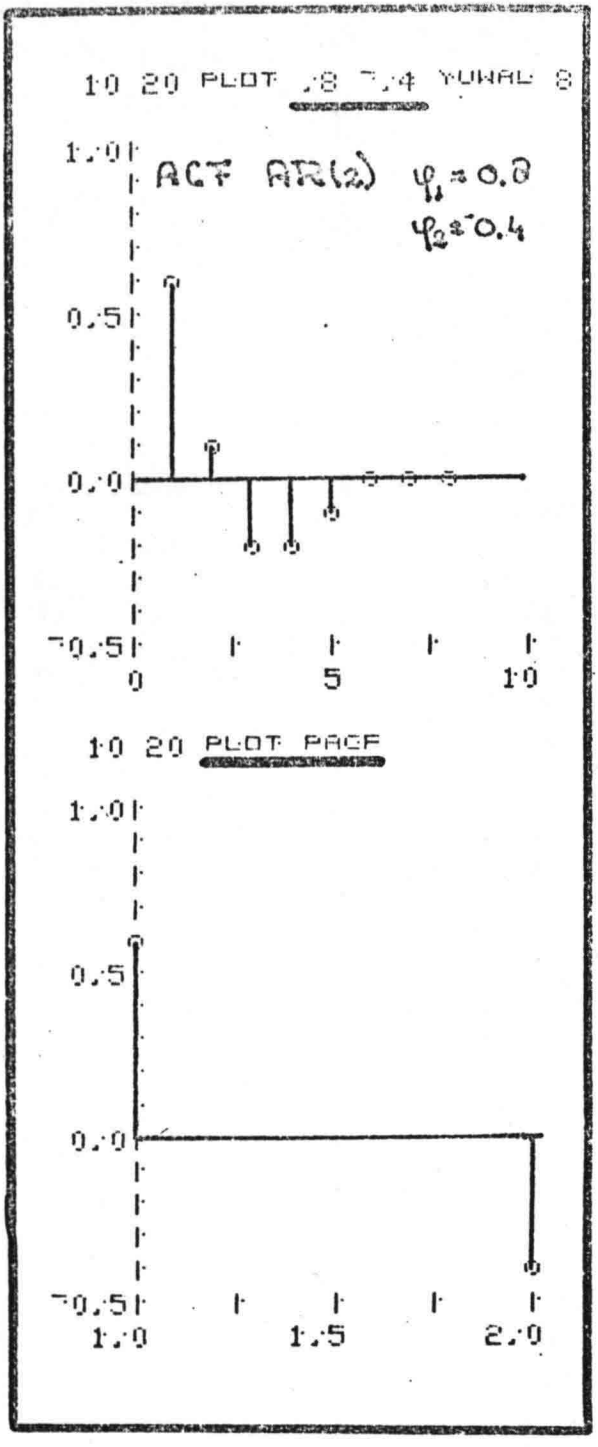
figuur 0



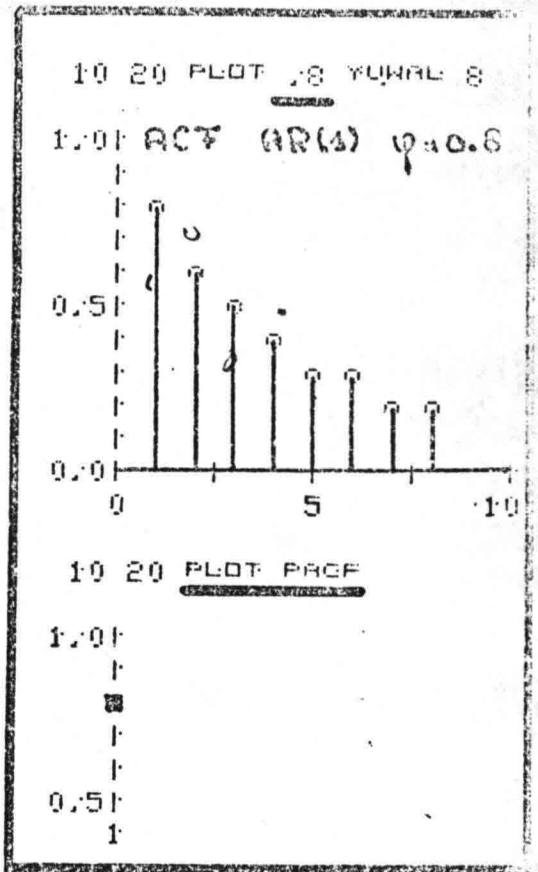
figuur 1



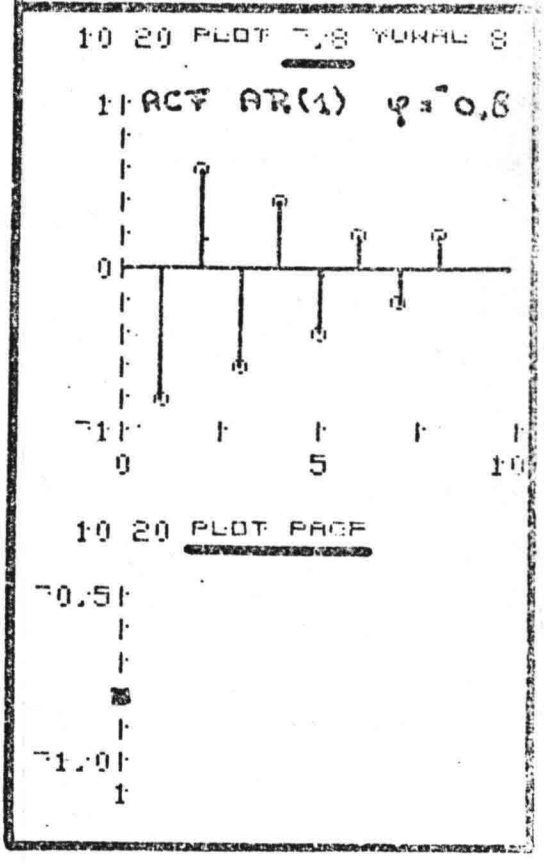
figuur 2


10 20 PLOT ,8 ⁻,4 YUNAL 8
ACF AR(2) φ1=0.8
φ2=-0.4
1.0
0.5
0.0
-0.5
0
5
10
10 20 PLOT PACF
1.0
0.5
0.0
-0.5
1.0
1.5
2.0

③

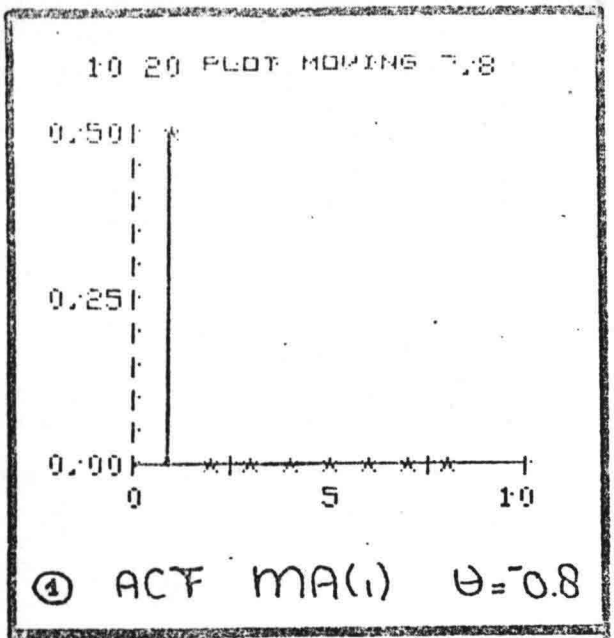

10 20 PLOT ,8 YUNAL 8
ACF AR(1) φ=0.6
1.0
0.5
0.0
0
5
10
10 20 PLOT PACF
1.0
0.5
1

①

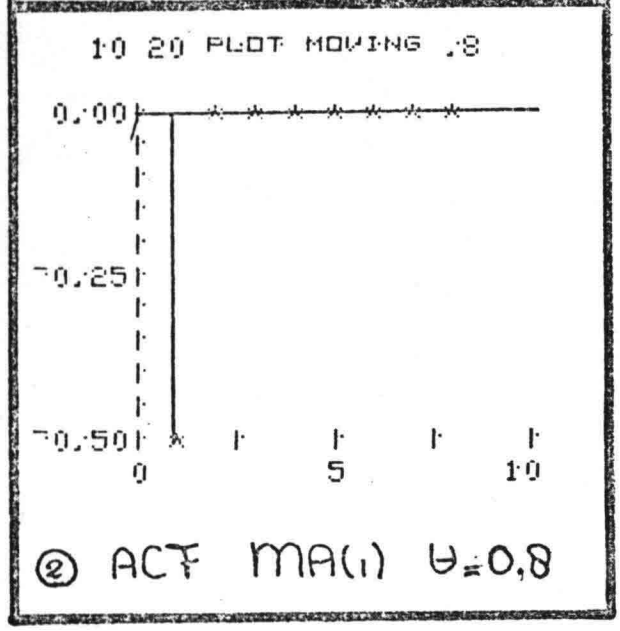

10 20 PLOT ⁻,8 YUNAL 8
ACF AR(1) φ=-0.6
1
0
-1
0
5
10
10 20 PLOT PACF
-0.5
-1.0
1

②

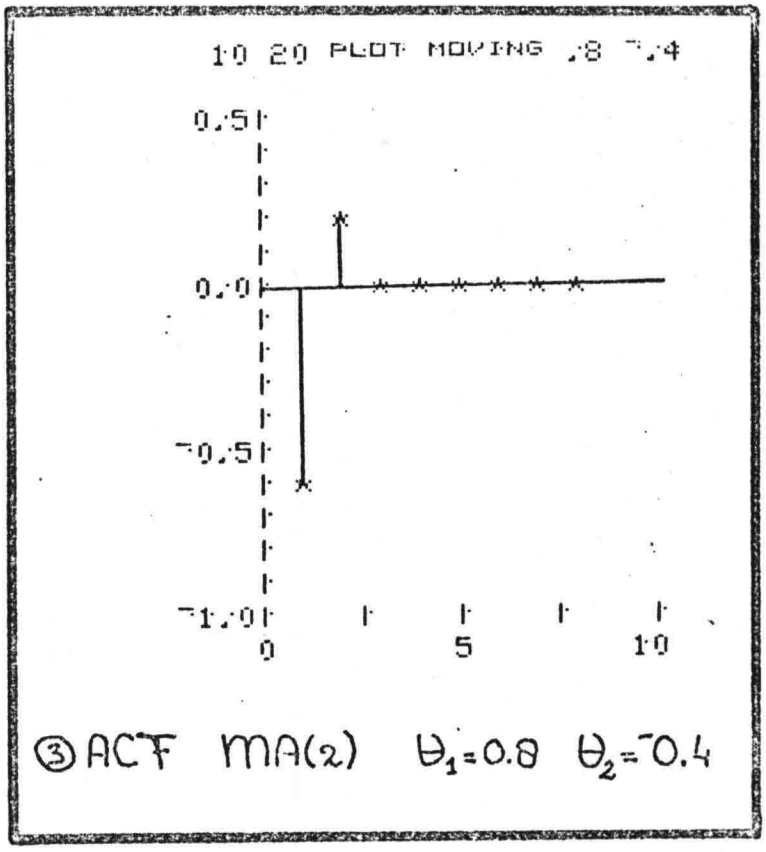
figuur 3



① ACF MA(1) $\theta = -0.8$



② ACF MA(1) $\theta = 0,8$



③ ACF MA(2) $\theta_1 = 0.8$ $\theta_2 = -0.4$

figure 4

AIDS FOR IDENTIFICATION

THE IDENTIFICATION OF THE MODEL IS OF COURSE THE BASIS FOR FURTHER DEVELOPMENTS. THE FOLLOWING INGREDIENTS ARE ESSENTIAL:

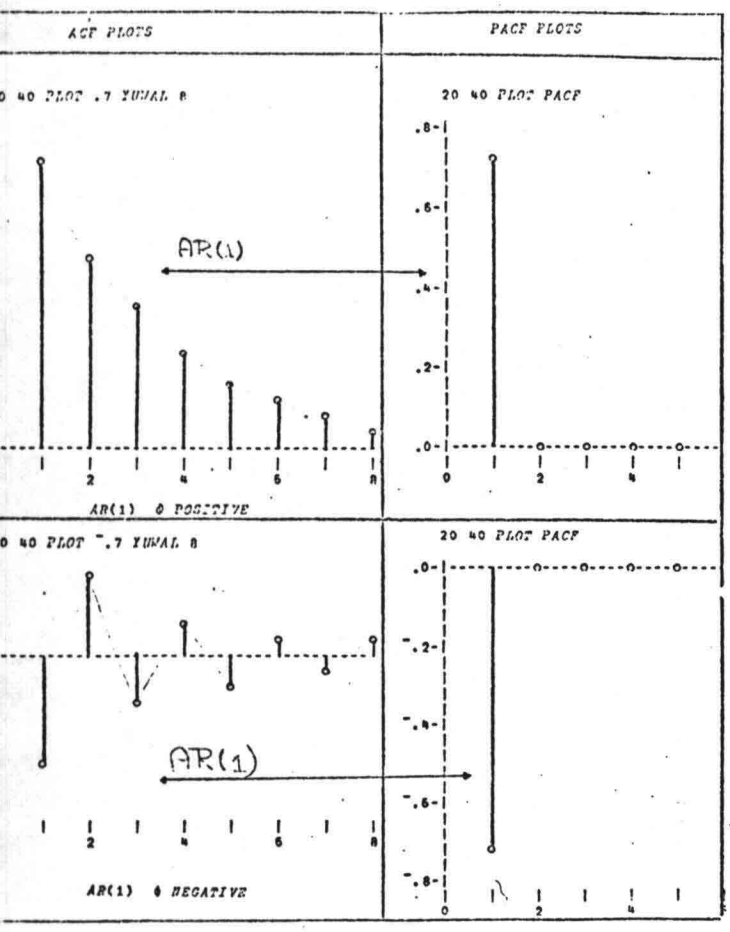
1. THE ORDER OF DIFFERENCING REQUIRED TO ACHIEVE STATIONARITY.
2. THE NUMBER OF AR AND/OR MA TERMS.
3. THE DEGREE AND PERIOD OF SEASONALITY

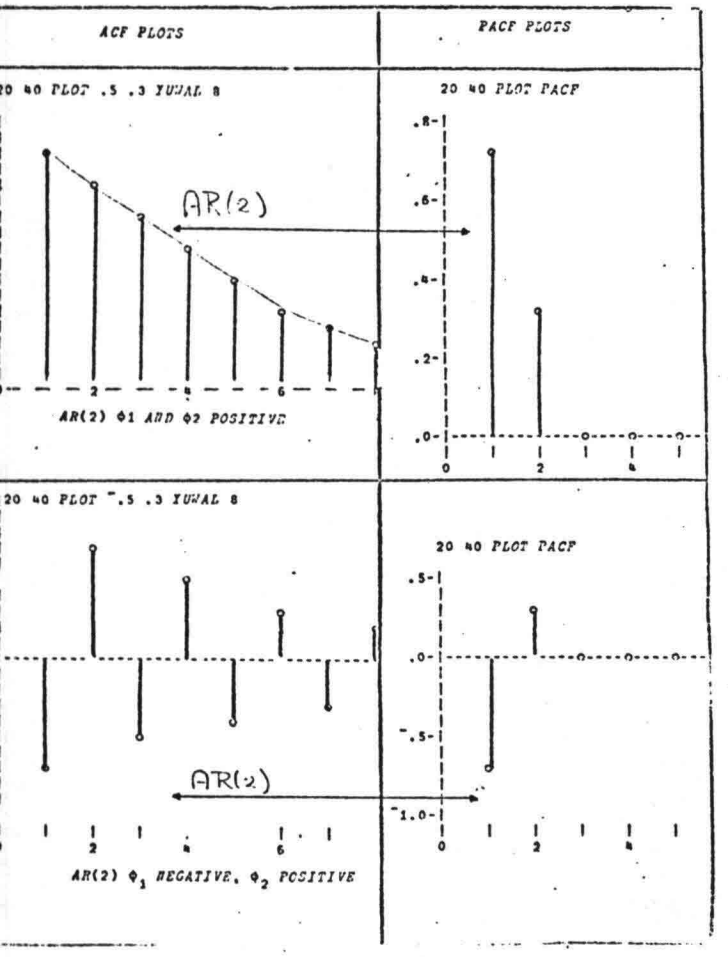
ABOVE CAN BE DETERMINED BY STUDYING THE ACF AND PACF. FORTUNATELY THE CLASS AND DEGREE OF EACH SET FOLLOWS A CHARACTERISTIC PLOT. IN GENERAL THE FOLLOWING SUMMARY APPLIES TO STOCHASTIC PROCESSES:

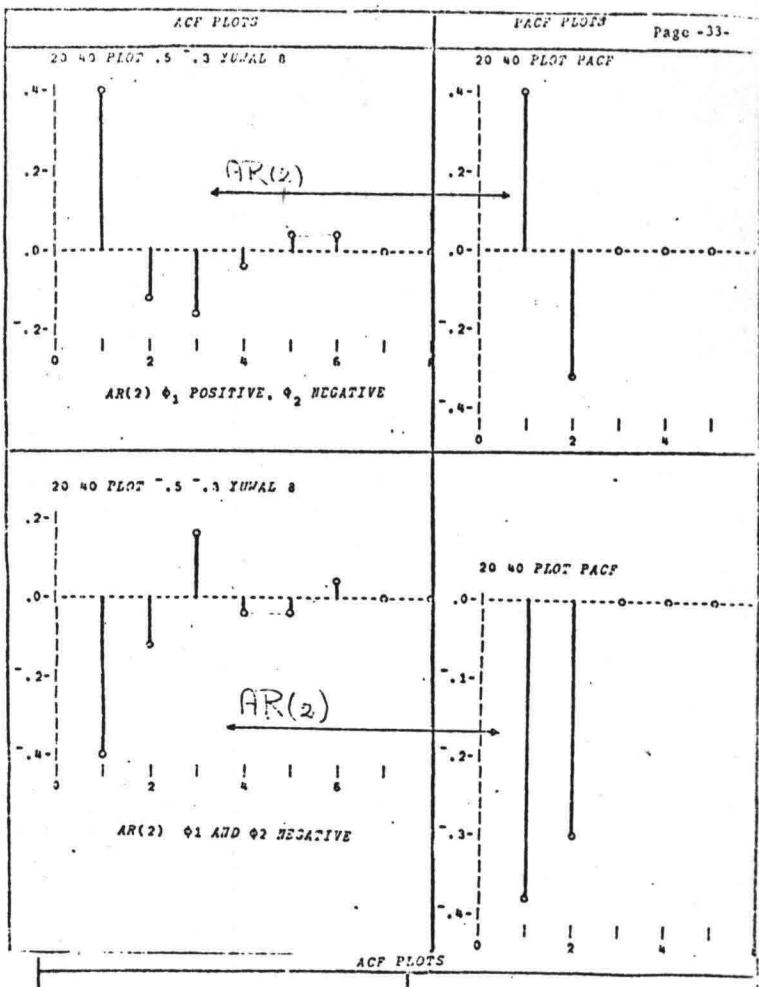
	AR	MA	AR-MA
ACF	INFINITE (DAMPED EXPONENTIALS AND/OR DAMPED SINE WAVES)	FINITE(SPIKES)	SAME AS AR AFTER Q-P LAGS
	TAILS OFF	CUTS OFF	TAILS OFF
PACF	SIMILAR TO ACF OF MA	SIMILAR TO ACF OF AR	SIMILAR TO ACF OF AR-MA
STATIONARITY	ROOTS OF $\phi(B)=0$ LIE OUTSIDE UNIT CIRCLE	ALWAYS STATIONARY	AS IN AR
INVERTIBILITY	ALWAYS INVERTIBLE	ROOTS OF $\theta(B)=0$ OUTSIDE UNIT CIRCLE	AS IN MA

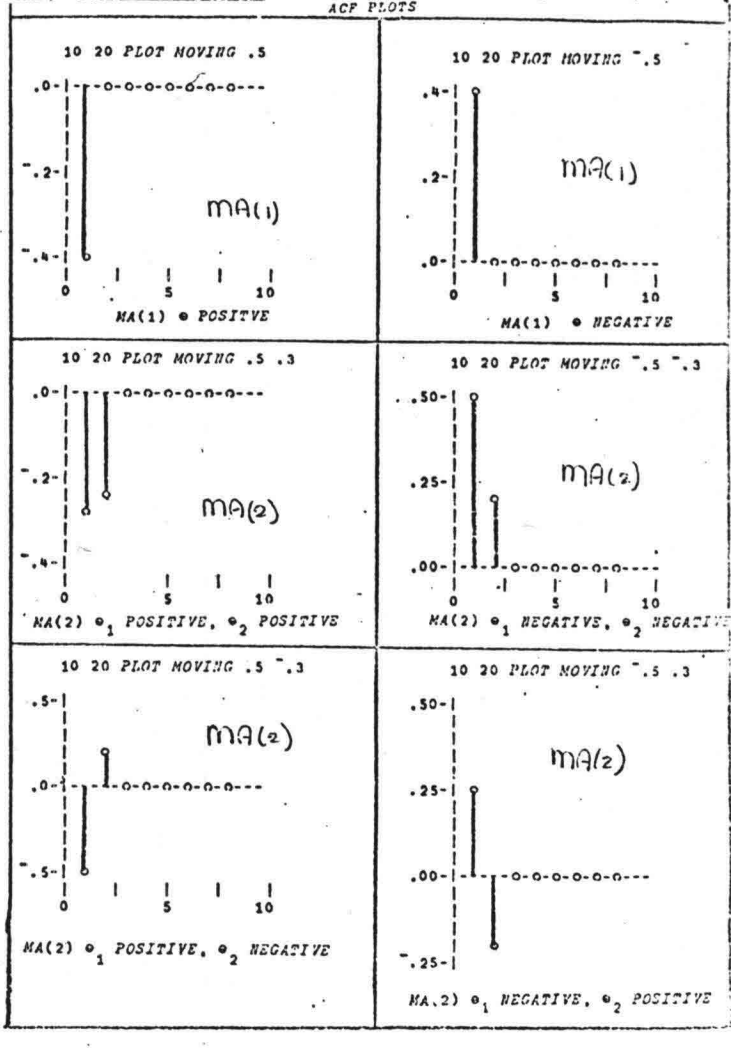
DENTIFICATION MAY BE STARTED BY TRANSFORMING THE SERIES IF NON STATIONARITY IS OBVIOUS. PLOTTING IS ADVISABLE.SEASONALITY IS PRESENT WHEN LARGE AUTOCORRELATIONS OCCUR EACH S LAGS.(S IS THEN THE PERIOD)

figuur 5


ACF PLOTS
PACF PLOTS
0 40 PLOT .7 YUWAL 8
20 40 PLOT PACF
AR(1)
AR(1) ϕ POSITIVE
0 40 PLOT -.7 YUWAL 8
20 40 PLOT PACF
AR(1)
AR(1) ϕ NEGATIVE

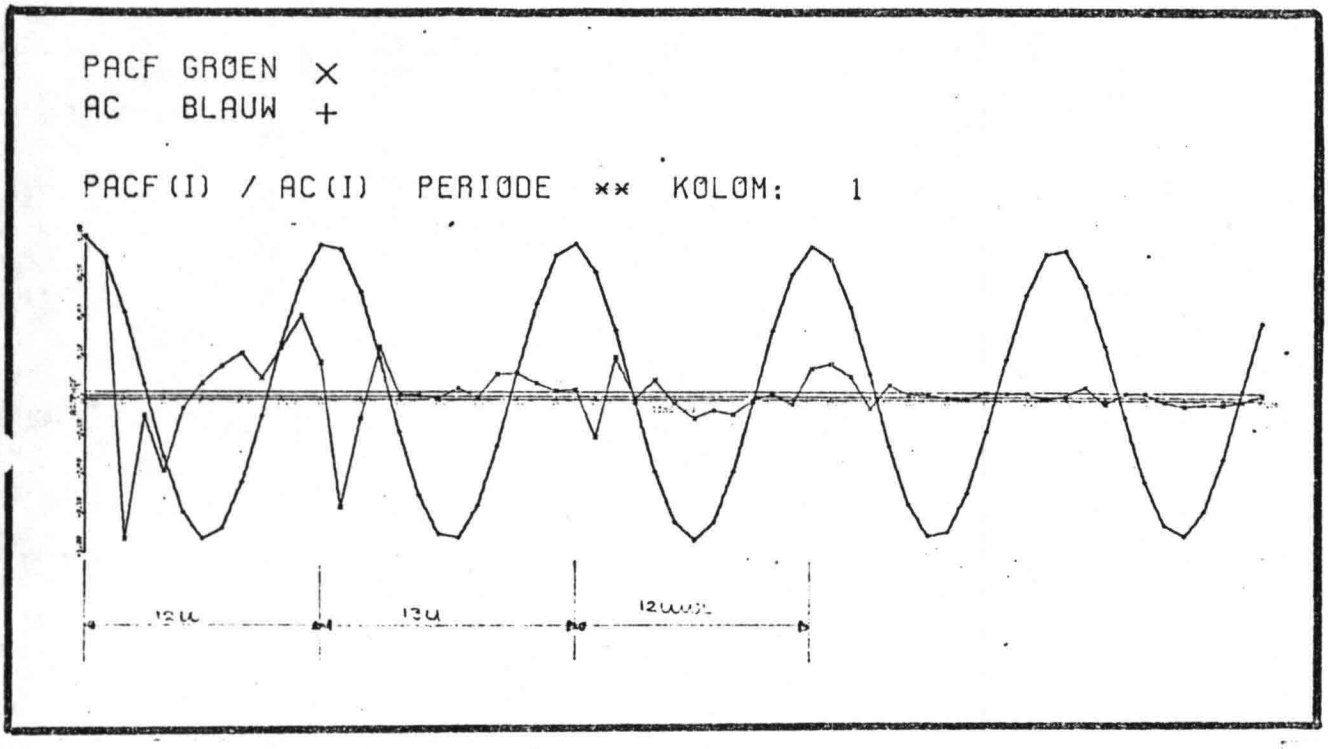

ACF PLOTS
PACF PLOTS
20 40 PLOT .5 .3 YUWAL 8
20 40 PLOT PACF
AR(2)
AR(2) ϕ1 AND ϕ2 POSITIVE
20 40 PLOT -.5 .3 YUWAL 8
20 40 PLOT PACF
AR(2)
AR(2) ϕ1 NEGATIVE, ϕ2 POSITIVE


ACF PLOTS
PACF PLOTS
20 40 PLOT .5 -.3 YUWAL 8
20 40 PLOT PACF
AR(2)
AR(2) ϕ1 POSITIVE, ϕ2 NEGATIVE
20 40 PLOT -.5 -.3 YUWAL 8
20 40 PLOT PACF
AR(2)
AR(2) ϕ1 AND ϕ2 NEGATIVE


ACF PLOTS
10 20 PLOT MOVING .5
MA(1)
MA(1) ϴ POSITVE
10 20 PLOT MOVING -.5
MA(1)
MA(1) ϴ NEGATIVE
10 20 PLOT MOVING .5 .3
MA(2)
MA(2) ϴ1 POSITIVE, ϴ2 POSITIVE
10 20 PLOT MOVING -.5 -.3
MA(2)
MA(2) ϴ1 NEGATIVE, ϴ2 NEGATIVE
10 20 PLOT MOVING .5 -.3
MA(2)
MA(2) ϴ1 POSITIVE, ϴ2 NEGATIVE
10 20 PLOT MOVING -.5 .3
MA(2)
MA(2) ϴ1 NEGATIVE, ϴ2 POSITIVE

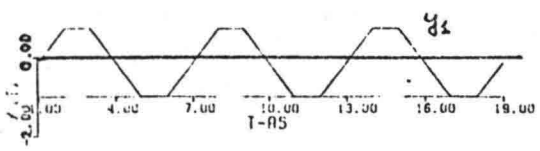
Figuur 6

Figuur 7

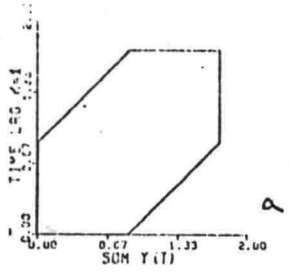


meet serie

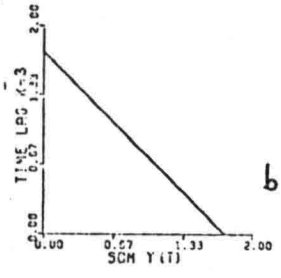
figuur 8



y_1



a



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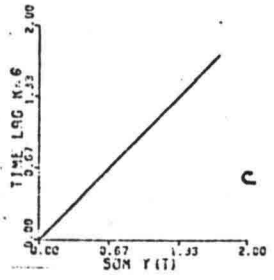
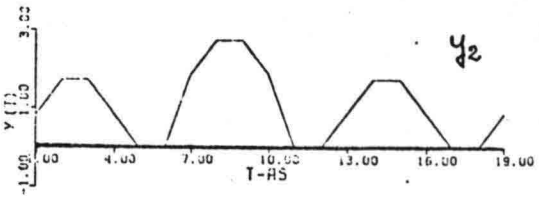
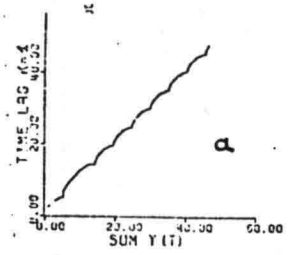


c

figuur I



y_2



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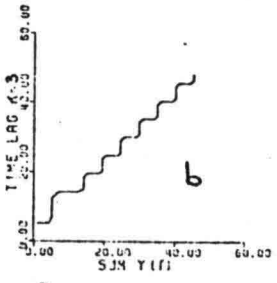
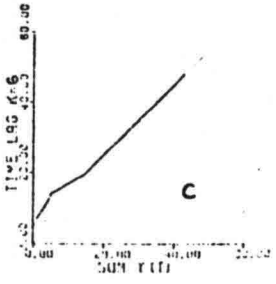
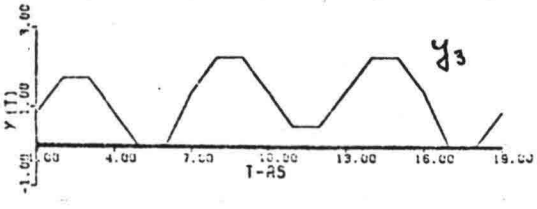


b



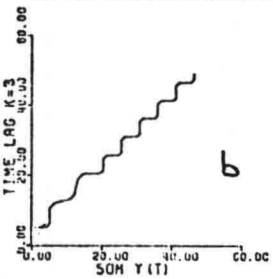
c

figuur II



y_3

figuur III



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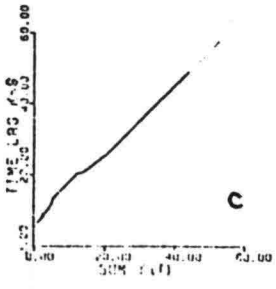
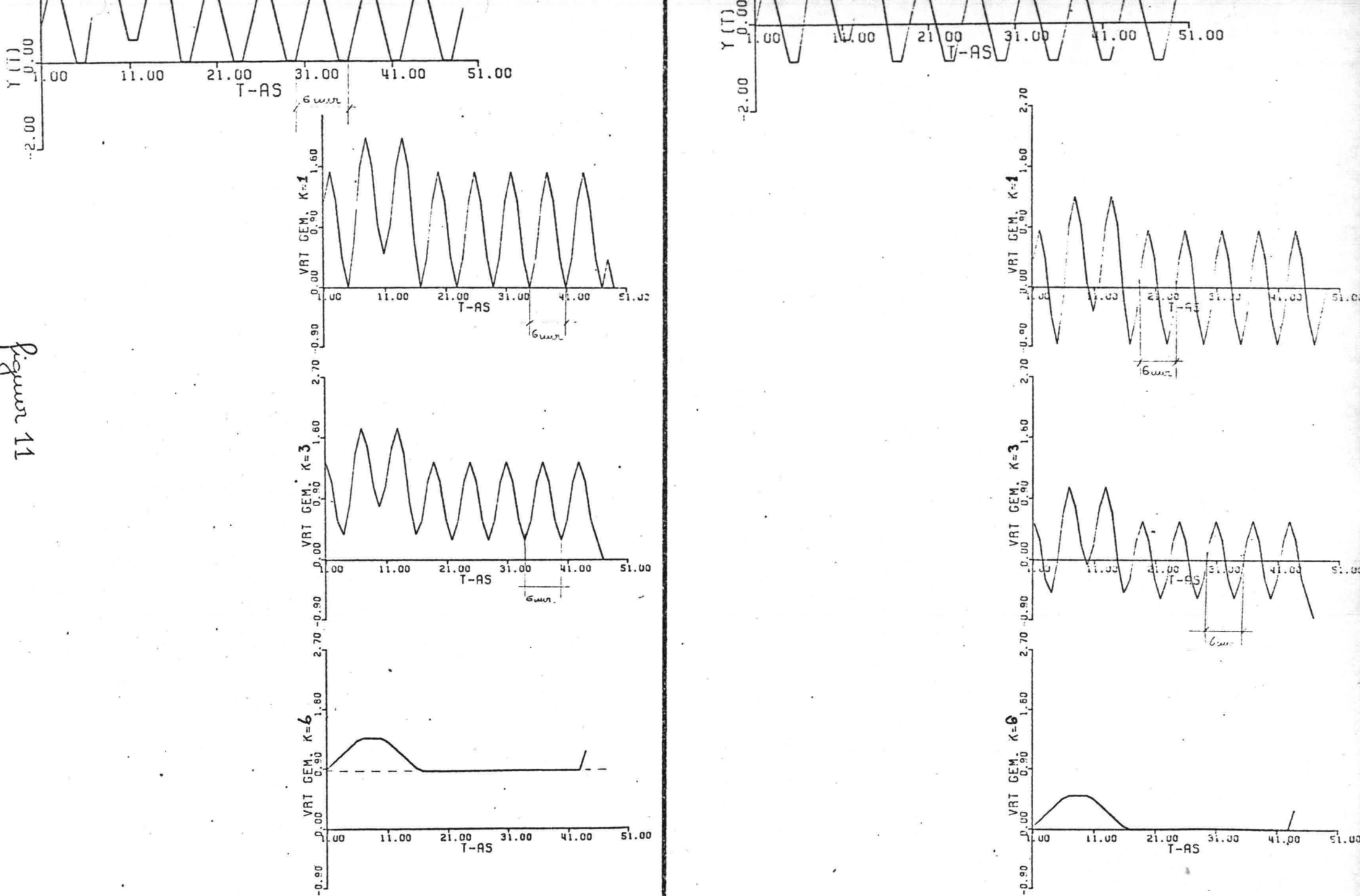


c

figuur 9

figuur 10


Y (T)
0.00
-2.00
1.00
11.00
21.00
31.00
41.00
51.00
T-AS
6 sec
VRT GEM. K=1
VRT GEM. K=3
VRT GEM. K=6
1.60
0.90
-0.90
2.70

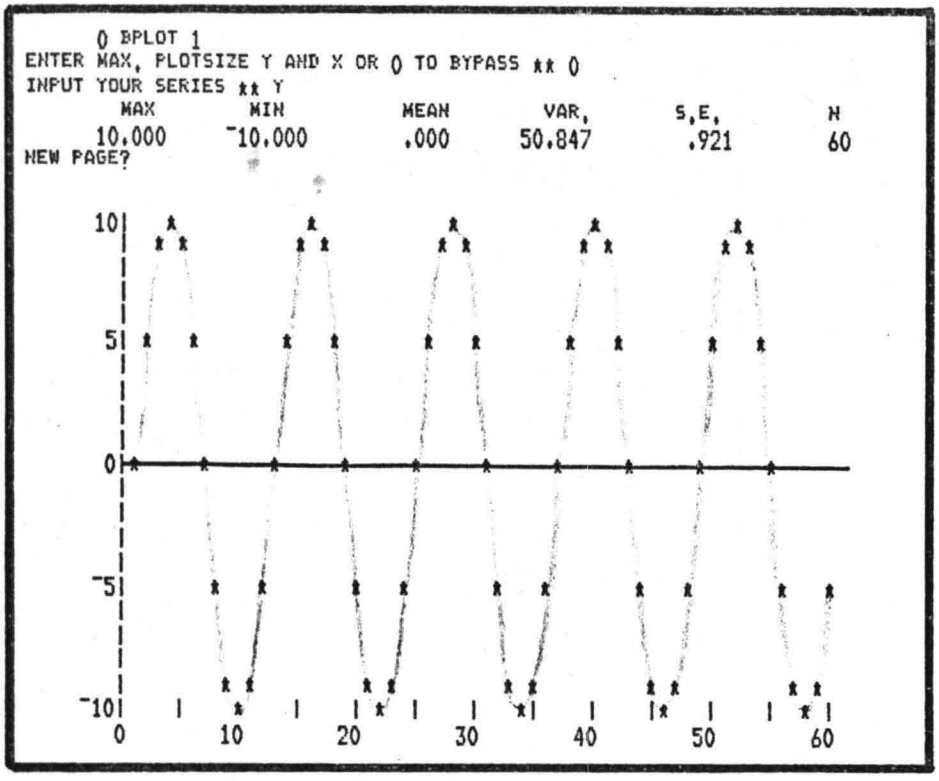
Figuur 11

VBT: GEM
1
13.40
29.60
43.20
57.00
72.00
85.40
100.80
115.20
129.60
144.00
1
13.40
29.60
43.20
57.00
72.00
85.40
100.80
115.20
129.60
144.00

Figuur 12

```
      20 DESCRIPTION MEET
A DESCRIPTIVE ANALYSIS ON THE INPUT DATA VECTOR YIELDS THE FOLLOWING
MAXIMUM 397.86
MINIMUM -257.14
AVERAGE 0.732654
STD.DEV 134.74
RANGE   655
NO. OBS 8784

ENTER UPPER AND LOWER LIMITS IN VECTOR FORM,
IF THE COMPUTED MAX AND MIN ARE DESIRED ,ENTER 0
□:
      400 -260
FREQUENCY HISTOGRAM ; EACH STAR = 1 PERCENT
      LOWER       UPPER        NO,      REL,FREQUENCY IN PERCENT
    -260.00     -230.00         39
    -230.00     -200.00        209      **
    -200.00     -170.00        530      ******
    -170.00     -140.00        846      **********
    -140.00     -110.00        841      **********
    -110.00      -80.00        740      ********
     -80.00      -50.00        585      *******
     -50.00      -20.00        580      *******
     -20.00       10.00        459      *****
      10.00       40.00        448      *****
      40.00       70.00        440      *****
      70.00      100.00        460      *****
     100.00      130.00        526      ******
     130.00      160.00        633      *******
     160.00      190.00        583      *******
     190.00      220.00        503      ******
     220.00      250.00        258      ***
     250.00      280.00         80      *
     280.00      310.00         13
     310.00      340.00          7
     340.00      370.00          2
     370.00      400.00          2

THE FOLLOWING ARE PERCENT AND NUMBER OUTSIDE INDICATED LIMITS
    -260.00         .00          0
     400.00         .00          0

THE MEDIAN IS            -18.14
THE MODE IS              -140.47
THE VECTOR CONTAINS VALUES WHICH ARE ≤ 0, THE GEOMETRIC MEAN CANNOT BE C
    OMPUTED,
THE HARMONIC MEAN IS     -97.161
THE QUADRATIC MEAN IS    134.75
COEFFICIENT OF KURTOSIS 1.7908
COEFFICIENT OF SKEWNESS 0.20792

DO YOU WANT A CUMULATIVE HISTOGRAM? Y/N

Y
CUMULATIVE FREQUENCY HISTOGRAM  meken
      LOWER       UPPER        NO,      REL, CUMULATIVE FREQ, IN PERCENT
    -260.00     -230.00         39      *
    -230.00     -200.00        248      *
    -200.00     -170.00        778        *
    -170.00     -140.00       1624          *
    -140.00     -110.00       2465            *
    -110.00      -80.00       3205              *
     -80.00      -50.00       3790                *
     -50.00      -20.00       4370                  *
     -20.00       10.00       4829                   *
      10.00       40.00       5277                    *
      40.00       70.00       5717                      *
      70.00      100.00       6177                       *
     100.00      130.00       6703                         *
     130.00      160.00       7336                           *
     160.00      190.00       7919                             *
     190.00      220.00       8422                               *
     220.00      250.00       8680                                *
     250.00      280.00       8760                                *
     280.00      310.00       8773                                *
     310.00      340.00       8780                                *
     340.00      370.00       8782                                *
     370.00      400.00       8784                                *
```

figuur 13

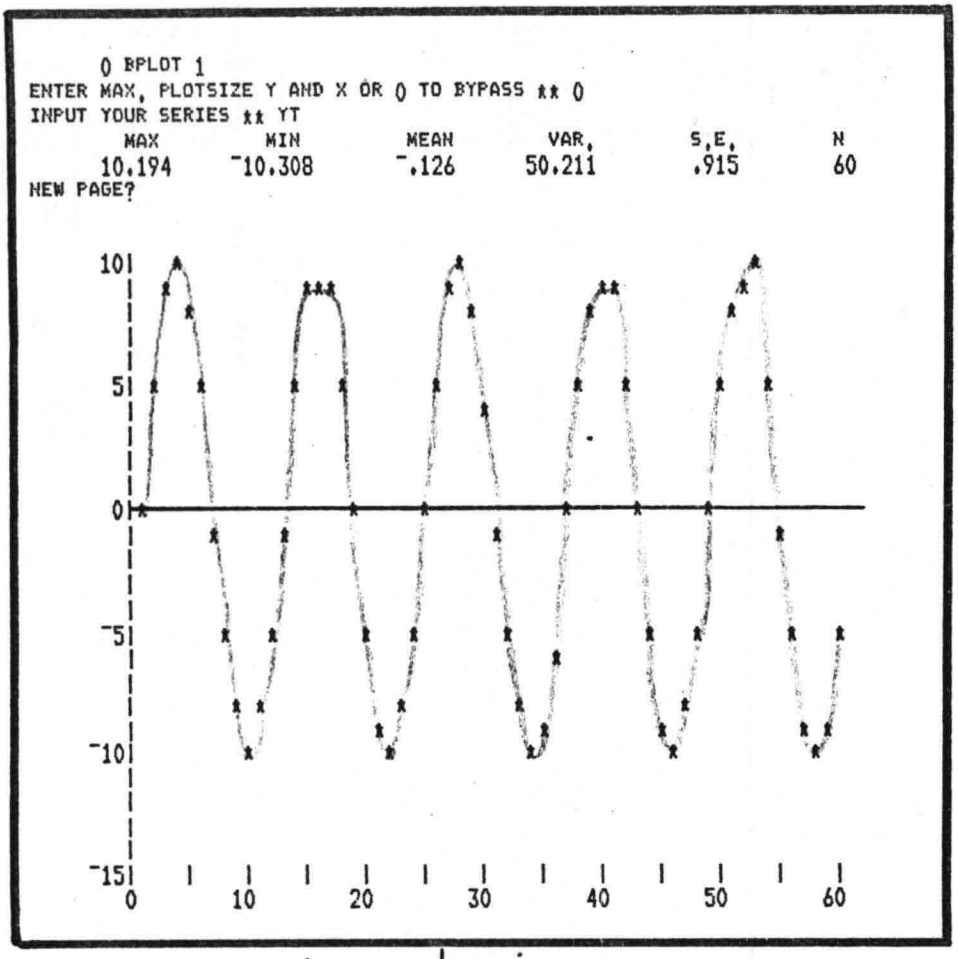


sinus

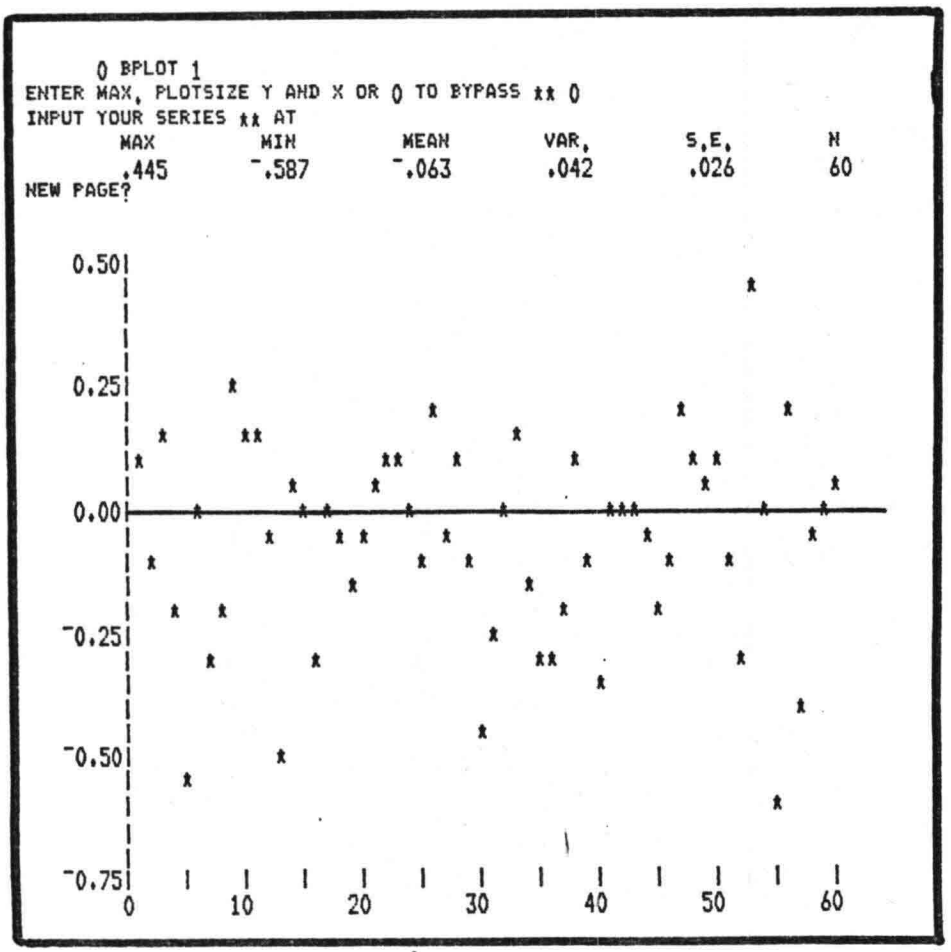
figuur 15

```
143   98   32  -47 -108 -151 -159 -129  -87  -29   54  134    00000010
148  117   61  -14  -90 -143 -172 -157 -114  -58   19  130    00000020
165  146   97   31  -39  -95 -119 -108  -67  -21   45  144    00000030
229  240  205  136   38  -53 -107 -123  -99  -66  -18   51    00000040
157  189  150   90   -3  -93 -164 -195 -177 -132  -78  -19    00000050
 95  190  182  131   57  -37 -122 -183 -196 -153 -107  -44    00000060
 67  191  202  156   92   -1  -99 -160 -176 -138  -96  -43    00000070
 24  157  217  183  129   38  -64 -144 -207 -206 -152  -98    00000080
-28  106  219  207  151   77  -29 -130 -194 -207 -162 -113    00000090
-55   26  187  210  165   99   -1 -105 -192 -234 -207 -154    00000100
-95  -13  163  228  194  137   48  -61 -149 -203 -195 -141    00000110
-82  -12  108  255  243  194  124   12  -95 -170 -199 -143    00000120
-84  -34   79  254  248  196  132   23  -81 -155 -191 -151    00000130
```

figuur 14



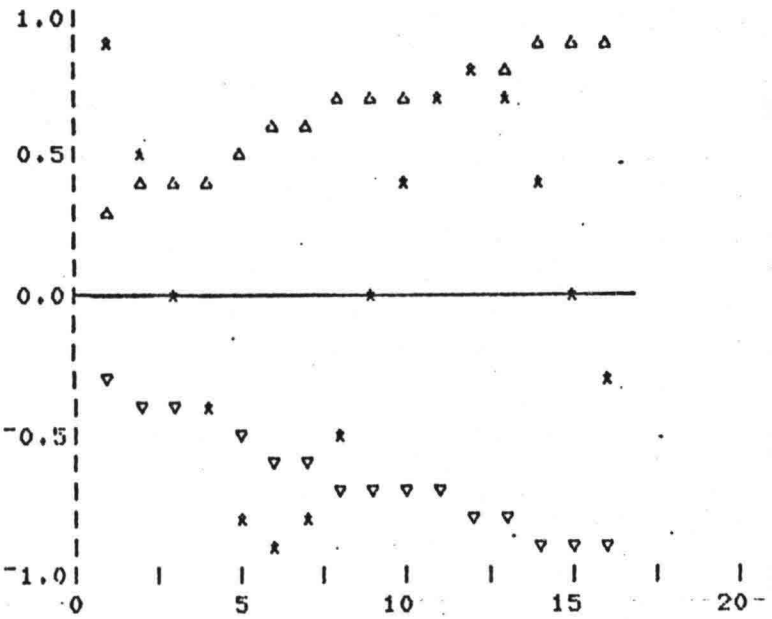
sinus met ruis



ruis

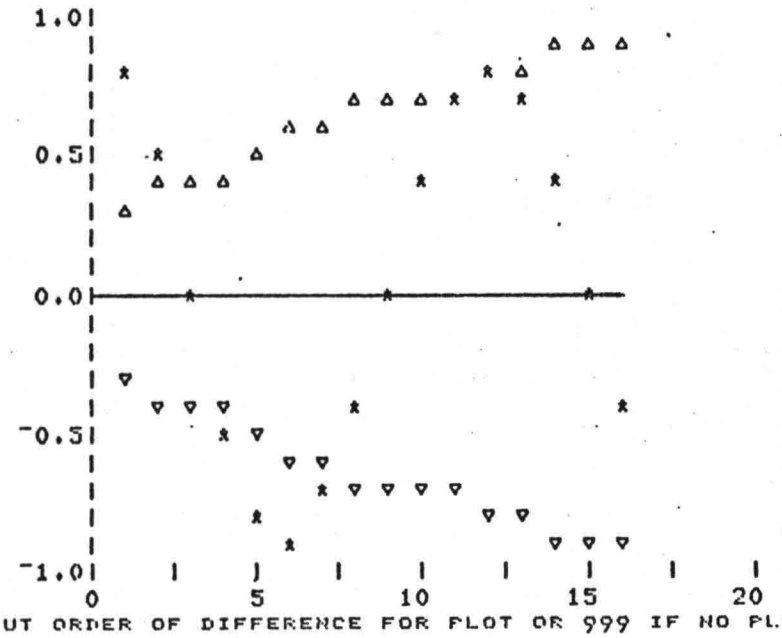
figuur 16

```
      BOX 0
ENTER MAX, PLOTSIZE Y AND X OR 0 TO BYPASS ** 0

ENTER NO, INPUT SERIES FOR TRANSFER MODEL ANALYSIS, 0 FOR STOCHASTIC ONLY ** (

   ***BEGINNING OF STOCHASTIC PROCESS ANALYSIS***
ENTER SERIES,( VALUES OR VECTOR NAME) ** YT

TYPE 0,1,2,3,4,5,6 OR 7 FOR DESIRED TRANSFORMATION ** 0


    ***IDENTIFICATION SECTION***

INPUT MAX LAG FOR ACF              ** 16
DIFF                    0           1           2           3

MEAN                 -.031       -.085       -.021        .060
S.E.                  .919        .476        .256        .142
VAR.                50.657      13.383       3.795       1.154
D.F.                   60          59          58          57
APPROX.
SE(ACF)              .129        .130        .131        .132
        LAG
          1          .866        .836        .835        .581
          2          .508        .457        .484        .374
          3          .029       -.028        .018        .089
          4         -.441       -.487       -.449       -.474
          5         -.779       -.806       -.775       -.623
          6         -.900       -.894       -.882       -.696
          7         -.779       -.745       -.757       -.659
          8         -.459       -.408       -.439       -.344
          9         -.030        .027       -.013        .026
         10          .391        .437        .395        .310
         11          .693        .715        .689        .588
         12          .800        .795        .789        .664
         13          .693        .657        .670        .508
         14          .408        .354        .387        .306
         15          .028       -.028        .015        .018
         16         -.342       -.387       -.352       -.329

INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 0
NEW PAGE?
```



Figuur 17 I

```
INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 1
NEW PAGE?
```

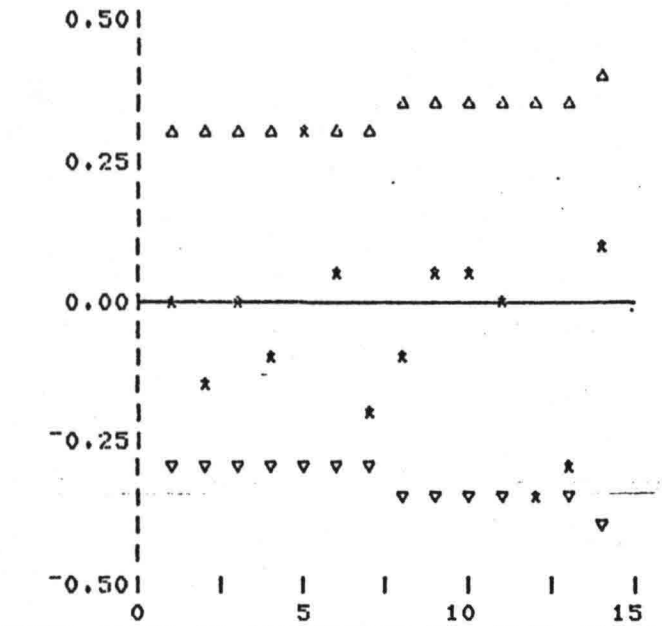



```
INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 999

ENTER PERIOD OF SEASONALITY          ** 12
WHICH REGULAR DIFFERENCE?            ** 0
INPUT MAX LAG FOR ACF                ** 0

   ***SPECIFICATION SECTION***

CHOOSE DEGREE OF DIFFERENCE          ** 0
INPUT NUMBER OF AR TERMS             ** 1   <----
INPUT DESIRED LAGS FOR AR TERMS      ** 1
INPUT NUMBER OF MA TERMS             ** 0
INPUT A 1 FOR A MEAN ,0 IF NOT       ** 1
INPUT PERIOD OF SEASONALITY          ** 12  <----
CHOOSE DEGREE OF SEAS DIFFERENCE     ** 1   <----
INPUT NO, OF SEAS AR TERMS           ** 0   <----
INPUT NO, OF SEAS MA TERMS           ** 0

STATISTISTICS ON THE W SERIES
        MAX          MIN          MEAN          VAR,          S,E,          N
        .274         -.300        -.000         .018          .020          48

   ***INITIAL FITTING SECTION***

INITIAL AR ESTIMATES;          0.10924
INITIAL CONSTANT ESTIMATE     -0.00027632

   ***FINAL FITTING SECTION***

ENTER EPS AND EPS2 OR 0 TO BYPASS ** 0
CONVERGENCE IS ASSUMED AT ITERATION NO: 1
NUMBER OF ITERATIONS PERFORMED       : 2
THE RESIDUAL VARIANCE IS             :  0.017746  <----
```

figure 17 II

```
FINAL AR ESTIMATES              0.11872
FINAL MA ESTIMATES
FINAL SEAS, AR ESTIMATES
FINAL SEAS, MA ESTIMATES
FINAL ESTIMATE FOR MEAN        -0.0010114
FINAL ESTIMATE FOR CONSTANT    -0.00089135


ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES ** .9
                 COEFFICIENT                    B/SIGNA(B)     CONFIDENCE INTERVAL
        TERM          B            SIGNA(B)         T          LOWER          UPPER
          1          .119            .139           .852         -.110          .348
          2         -.001            .022          -.046         -.038          .036
CORRELATION MATRIX
  1          -0.0030699
 -0.0030699   1

   ***DIAGNOSTIC SECTION ON RESIDUALS***
THE CHI SQUARE STATISTIC = 23.789  WITH 23 DEGREES OF FREEDOM
THE LEVEL OF SIGNIFICANCE (1-CHISQUARE PROBABILITY)= 0.41559
INPUT MAX LAG FOR ACF              ** 14
DIFF                    0

MEAN                  .001
S.E.                  .019
VAR.                  .018
D.F.                    48
APPROX.
SE(ACF)               .144
          LAG
            1         .009
            2        -.150
            3        -.009
            4        -.090
            5         .294
            6         .065
            7        -.218
            8        -.109
            9         .035
           10         .043
           11         .016
           12        -.343
           13        -.323
           14         .099

INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 0
NEW PAGE?
```

figur 17 III



INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 999

INPUT MAX HARMONIC FOR PERIODOGRAM ** 14

CUMULATIVE PERIODOGRAM (NORMALIZED)

10 PERCENT LIMIT LINES

COUNT	CUM. PER.	LOWER	EST.	UPPER
1	.009	.000	.042	.296
2	.137	.000	.083	.338
3	.141	.000	.125	.379
4	.158	.000	.167	.421
5	.162	.000	.208	.463
6	.232	.000	.250	.504
7	.240	.037	.292	.546
8	.252	.079	.333	.588
9	.377	.121	.375	.629
10	.526	.162	.417	.671
11	.537	.204	.458	.713
12	.549	.246	.500	.754
13	.571	.287	.542	.796
14	.595	.329	.583	.838

THE TOTAL NUMBER OF LINE CROSSINGS = 0

TYPE 1 IF SATISFIED WITH MODEL, 0 TO RETURN TO SPECIFICATION ** 1

Figure 17 IV

```
   ***STOCHASTIC FORECASTING SECTION***

ENTER VECTOR OF; LEADS ,ORIGIN,AND CONFIDENCE COEFFICIENT ** 10 60 .9
```

	90 PERCENT CONFIDENCE LIMITS		
OBS	LOWER	FORECAST	UPPER
61	-.203	.016	.235
62	4.826	5.047	5.267
63	8.396	8.617	8.837
64	9.622	9.842	10.063
65	8.662	8.883	9.103
66	4.790	5.011	5.231
67	-.514	-.294	-.073
68	-5.114	-4.894	-4.673
69	-9.070	-8.849	-8.629
70	-10.252	-10.031	-9.810

```
INPUT NO OF OBSERVATIONS PRECEDING FORECAST FOR PLOT OR 999 IF NO PLOT ** 10
ENTER MAX, PLOTSIZE Y AND X OR 0 TO BYPASS ** 0
NEW PAGE?
```

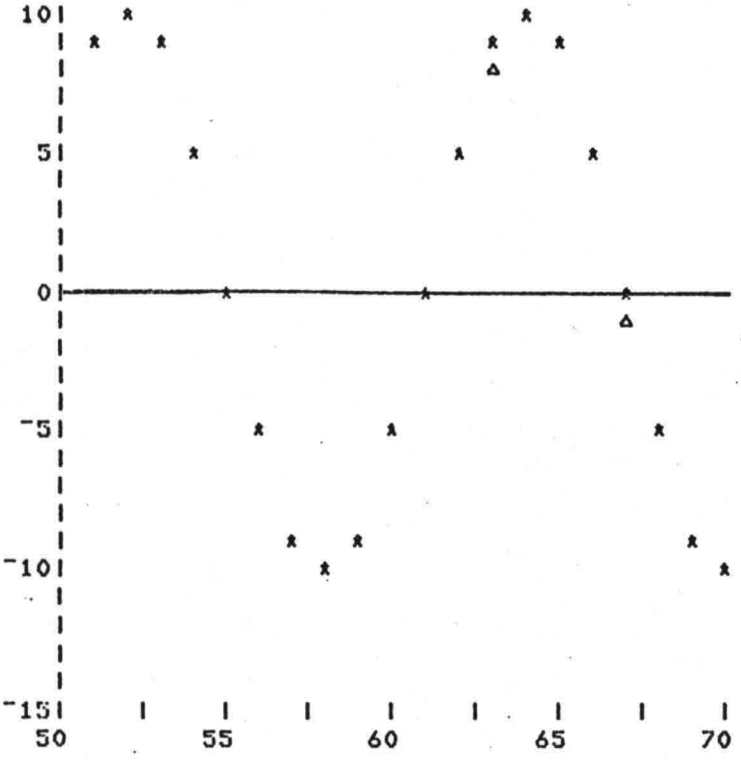
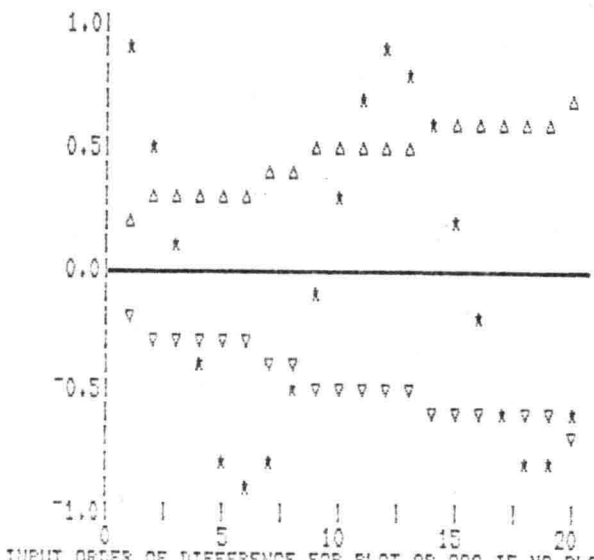


Figure 17 V

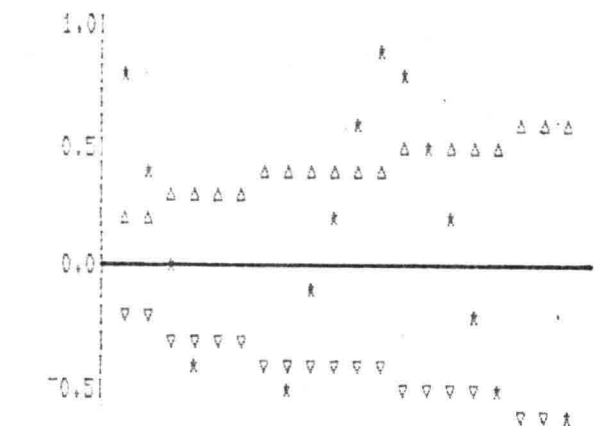
```
   ***SPECIFICATION SECTION***

CHOOSE DEGREE OF DIFFERENCE          ** 0
INPUT NUMBER OF AR TERMS             ** 0   <----
INPUT NUMBER OF MA TERMS             ** 0
INPUT A 1 FOR A MEAN ,0 IF NOT       ** 1
INPUT PERIOD OF SEASONALITY          ** 12  <----
CHOOSE DEGREE OF SEAS DIFFERENCE     ** 0
INPUT NO, OF SEAS AR TERMS           ** 1   <----
INPUT NO, OF SEAS MA TERMS           ** 0

STATISTISTICS ON THE W SERIES
       MAX          MIN          MEAN          VAR,          S,E,          N
    10.097       -10.154         -.063        50.487          .917         60

   ***INITIAL FITTING SECTION***

INITIAL SEASONAL AR ESTIMATES 0.79994
INITIAL CONSTANT ESTIMATE     -0.012603

   ***FINAL FITTING SECTION***

ENTER EPS AND EPS2 OR 0 TO BYPASS ** 0
CONVERGENCE IS ASSUMED AT ITERATION NO: 2
NUMBER OF ITERATIONS PERFORMED       : 3
THE RESIDUAL VARIANCE IS             :  7.2807   <----

FINAL AR ESTIMATES
FINAL MA ESTIMATES
FINAL SEAS, AR ESTIMATES     0.86309
FINAL SEAS, MA ESTIMATES
FINAL ESTIMATE FOR MEAN      0.0098951
FINAL ESTIMATE FOR CONSTANT  0.0013547


ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES ** .9
              COEFFICIENT                    B/SIGMA(B)    CONFIDENCE INTERVAL
      TERM         B          SIGMA(B)          T          LOWER          UPPER
         1        .863          .033         26.072          .809          .918
         2        .010          .924           .011        -1.511         1.531
CORRELATION MATRIX
 1           0.00061671
 0.00061671  1

   ***DIAGNOSTIC SECTION ON RESIDUALS***
THE CHI SQUARE STATISTIC = 351.45  WITH 23 DEGREES OF FREEDOM
THE LEVEL OF SIGNIFICANCE (1-CHISQUARE PROBABILITY)= 0
INPUT MAX LAG FOR ACF                ** 0
```

figure 17 VI

```
      BOX 0
ENTER MAX, PLOTSIZE Y AND X OR 0 TO BYPASS ** 0

ENTER NO, INPUT SERIES FOR TRANSFER MODEL ANALYSIS, 0 FOR STOCHASTIC ONLY ** 0

   ***BEGINNING OF STOCHASTIC PROCESS ANALYSIS***
ENTER SERIES,( VALUES OR VECTOR NAME) ** ZZ

TYPE 0,1,2,3,4,5,6 OR 7 FOR DESIRED TRANSFORMATION ** 0


    ***IDENTIFICATION SECTION***

INPUT MAX LAG FOR ACF              ** 20
DIFF                  0          1          2          3

MEAN             -3.141     -1.897       .552       .634
S.E.             11.078      5.785      3.858      4.381
VAR.          19144.741  5187.288  2291.582  2936.720
D.F.                156        155        154        153
APPROX.
SE(ACF)            .080       .080       .081       .081
      LAG
        1          .858       .778       .355      -.226
        2          .507       .404       .005      -.301
        3          .051       .028       .043       .163
        4         -.404      -.364      -.122       .118
        5         -.753      -.701      -.424      -.167
        6         -.906      -.852      -.520      -.102
        7         -.825      -.774      -.481       .139
        8         -.535      -.486      -.198       .009
        9         -.115      -.120       .022       .179
       10          .325       .241       .013      -.120
       11          .691       .599       .162       .371
       12          .888       .833       .789       .640
       13          .844       .817       .582       .254
       14          .579       .499       .061      -.335
       15          .184       .156       .034       .037
       16         -.246      -.201      -.034      -.159
       17         -.613      -.541      -.294      -.074
       18         -.826      -.753      -.463      -.126
       19         -.831      -.760      -.468      -.120
       20         -.629      -.563      -.294      -.100

INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 0
NEW PAGE?
N
```

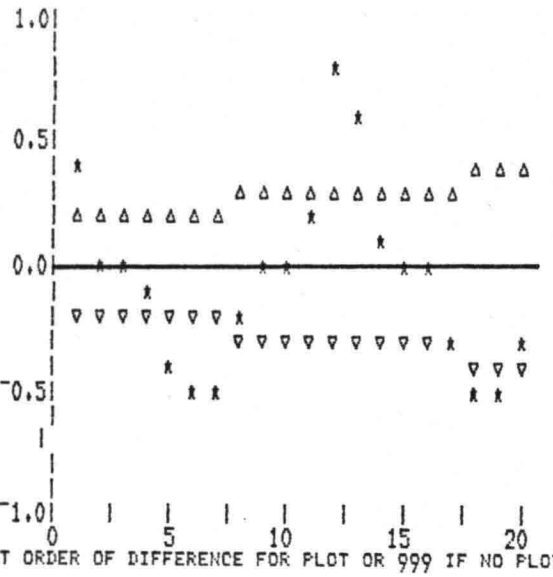



```
INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 1
NEW PAGE?
N
```



figur 17 B I

INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** (2)
NEW PAGE?
N

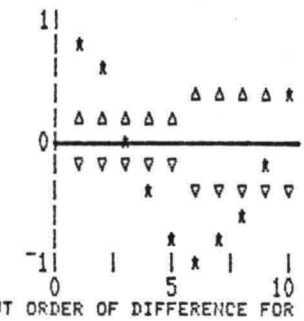


INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 999

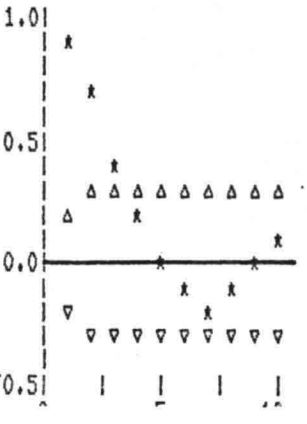
ENTER PERIOD OF SEASONALITY ** 12
WHICH REGULAR DIFFERENCE? ** 0
INPUT MAX LAG FOR ACF ** 10

DIFF	0	1	2
MEAN	-3.141	3.299	.114
S.E.	11.078	3.383	4.499
VAR.	19144.741	1648.393	2671.796
D.F.	156	144	132
APPROX. SE(ACF)	.080	.083	.087
LAG			
1	.858	.867	.911
2	.507	.651	.786
3	.051	.425	.654
4	-.404	.189	.518
5	-.753	-.016	.407
6	-.906	-.133	.318
7	-.825	-.153	.228
8	-.535	-.090	.118
9	-.115	.001	-.032
10	.325	.086	-.195

INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 0
NEW PAGE?
N

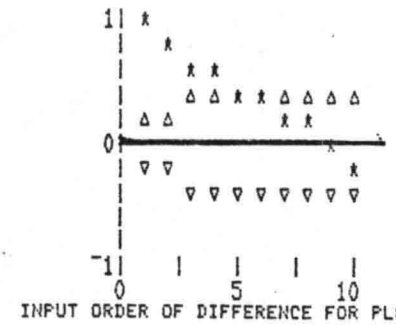


INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 1
NEW PAGE?
N



figuur 17 B II

```
INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 2
NEW PAGE?
N
```

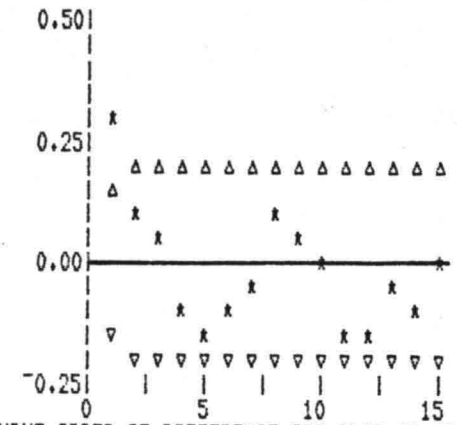



```
INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 999


   ***SPECIFICATION SECTION***

CHOOSE DEGREE OF DIFFERENCE          ** 0
INPUT NUMBER OF AR TERMS             ** 1
INPUT DESIRED LAGS FOR AR TERMS      ** 1
INPUT NUMBER OF MA TERMS             ** 0
INPUT A 1 FOR A MEAN ,0 IF NOT       ** 1
INPUT PERIOD OF SEASONALITY          ** 12
CHOOSE DEGREE OF SEAS DIFFERENCE     ** 1
INPUT NO, OF SEAS AR TERMS           ** 1
INPUT NO, OF SEAS MA TERMS           ** 0

STATISTISTICS ON THE W SERIES
        MAX          MIN          MEAN          VAR,          S,E,          N
    108,000      -93,000        3,299     1648,393         3,383        144


   ***INITIAL FITTING SECTION***

INITIAL AR ESTIMATES;          0,86734
INITIAL SEASONAL AR ESTIMATES 0,23811
INITIAL CONSTANT ESTIMATE     0,33339


   ***FINAL FITTING SECTION***

ENTER EPS AND EPS2 OR 0 TO BYPASS ** 0


CONVERGENCE IS ASSUMED AT ITERATION NO; 3
NUMBER OF ITERATIONS PERFORMED        ; 4
THE RESIDUAL VARIANCE IS              ;  313,92


FINAL AR ESTIMATES           0,89858
FINAL MA ESTIMATES
FINAL SEAS, AR ESTIMATES     0,48879
FINAL SEAS, MA ESTIMATES
FINAL ESTIMATE FOR MEAN      -1,3418
FINAL ESTIMATE FOR CONSTANT  -0,069565


ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES ** INPUT IS NOT NUMERIC, TRY AGAIN
ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES ** INPUT IS NOT NUMERIC, TRY AGAIN
ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES ** ,9
                COEFFICIENT                    B/SIGMA(B).   CONFIDENCE INTERVAL
      TERM          B          SIGMA(B)           T          LOWER          UPPER
        1         ,899           ,037          24,297         ,838           ,959
        2         ,489           ,072           6,817         ,371           ,607
        3       -1,342         23,015           -,058      -39,206         36,522
CORRELATION MATRIX
  1          0,060271  -0,061692
 0,060271    1         -0,064628
-0,061692   -0,064628   1

   ***DIAGNOSTIC SECTION ON RESIDUALS***
THE CHI SQUARE STATISTIC = 99,38  WITH 22 DEGREES OF FREEDOM
THE LEVEL OF SIGNIFICANCE (1-CHISQUARE PROBABILITY)= 0,000018567
INPUT MAX LAG FOR ACF            ** 15
DIFF                    0

MEAN                  ,226
S,E,                 1,474
VAR,               312,935
D,F,                   144
APPROX,
SE(ACF)                ,083
```

figuur 17 B III

LAG	
1	.283
2	.078
3	-.051
4	-.096
5	-.170
6	-.111
7	-.027
8	.100
9	.050
10	-.023
11	-.129
12	-.128
13	-.074
14	-.077
15	-.010

INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ?? 0
NEW PAGE?
N



INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ?? 999

INPUT MAX HARMONIC FOR PERIODOGRAM ?? 0

TYPE 1 IF SATISFIED WITH MODEL, 0 TO RETURN TO SPECIFICATION ?? 1

???STOCHASTIC FORECASTING SECTION???

ENTER VECTOR OF: LEADS ,ORIGIN,AND CONFIDENCE COEFFICIENT ??

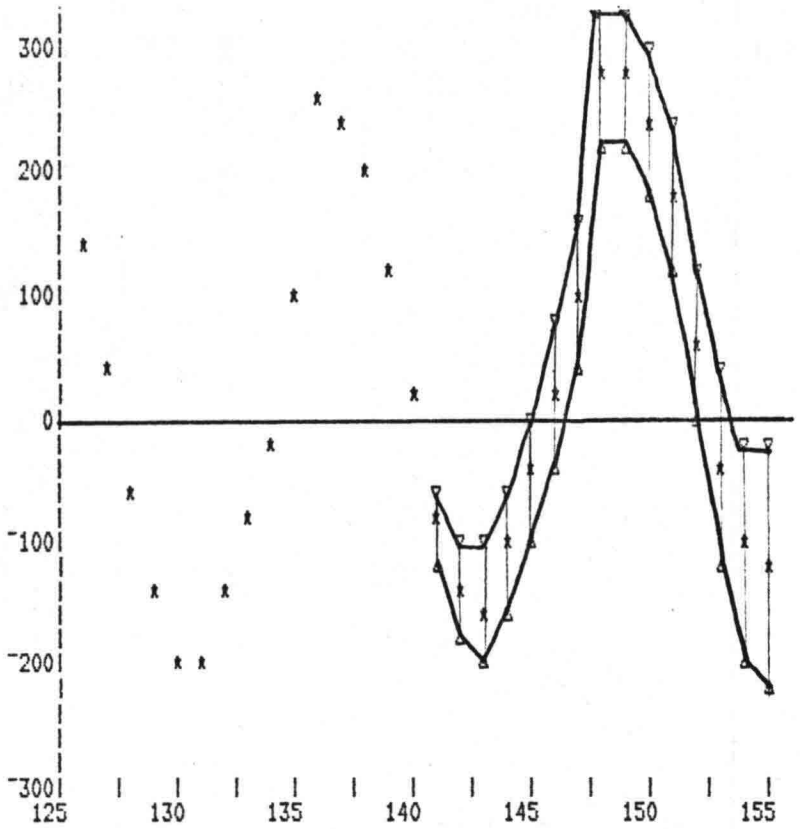
15 135
v
40 .9

	OBS	90 PERCENT CONFIDENCE LIMITS LOWER	FORECAST	UPPER
-95	141	-110.930	-81.781	-52.631
-170	142	-185.590	-146.401	-107.212
-199	143	-197.675	-151.961	-106.247
-143	144	-151.681	-101.312	-50.942
-94	145	-99.598	-45.762	8.074
-34	146	-41.207	15.272	71.752
79	147	46.587	105.114	163.641
234	148	229.562	289.692	349.821
248	149	224.803	286.196	347.589
196	150	176.690	239.085	301.479
132	151	113.364	176.556	239.747
23	152	-2.371	61.457	125.285
-81	153	-118.614	-36.616	45.383
-155	154	-201.891	-107.745	-13.600
-191	155	-224.030	-121.118	-18.205

* Δ = ±45.72

INPUT NO OF OBSERVATIONS PRECEDING FORECAST FOR PLOT OR 999 IF NO PLOT ?? 15
ENTER MAX, PLOTSIZE Y AND X OR 0 TO BYPASS ?? 0
NEW PAGE?
N

figuur 17 B




```
ALL VARIABLES EXCEPT THE ONES NEEDED FOR FORECASTING ARE NOW EXPUNGED
THE VECTOR ΔS CONTAINS THE RELEVANT VARIABLES,ΔL CONTAINS THEIR RESP, LENGTHS
IN GENERAL TO REFORECAST FROM SAME DATA ALL YOU NEED ARE THE VECTORS ΔS,ΔL
AND THE GROUP FORGP, PROCEED BY EXECUTING BUILT AND THEN FORCST1
IF YOU WANT TO RE-EXECUTE BOX, FIRST TYPE BUILT, THE ORIGINAL SERIES IS NOW NAMED X



      )OFF
ααα∧    □⊖▽⊖⊤ ⌊α∧ε/∧⌊⌊ε          α⍀↓+∧⌊⌊ε   ε⊃α⍀]⌈    ⌈∧⊖⌊α▽ε   αα⊤∧α□ ⌊ε
1714     7 α↓▽ 81/09,10.37      9 ⌊ 29 ⌈       10      512 '      356,46
'⊖⌊∧⌊⊤▽                0,00
WWW⌶α⌊⌈ □⊖▽▽ε⌊ ⊖__ ∧⌈⊖ α∧ 11(01(00 ⊖⊤ α↓▽↓⌈∧ 7, 1981
$
```

figur 17B

I	T2(I)	A(I)	FI(I)
1	0.04106700	10.98519000	63.05562000
2	13.94303000	9.52492500	156.71700000
3	15.04106000	5.07399500	353.85470000
4	27.88507000	3.11557600	301.85100000
5	27.96821000	12.17556000	216.40050000
6	28.43972000	25.46849000	238.51870000
7	28.51258000	9.30983700	72.31501000
8	28.98410000	174.90820000	296.85520000
9	29.45562000	5.40729800	359.85400000
10	29.52847000	12.22317000	183.65280000
11	30.00000000	46.79225000	212.93010000
12	30.08213000	11.62413000	65.29954000
13	57.96821000	13.05483000	235.66060000
14	58.98410000	8.15432400	147.19170000
15	86.95231000	9.10884200	244.09280000
16	87.96821000	8.50170400	163.49860000
17	116.95230000	4.51465500	154.37010000
18	145.93540000	1.78520900	100.86980000
19	174.92050000	1.15505700	108.11870000
20	0.54437500	1.12742100	323.93450000
21	1.01589500	5.36205400	270.26530000
22	1.09803200	1.34720000	182.55760000
23	1.48741700	3.90809100	285.99750000
24	13.39856000	3.23524100	150.44590000
25	14.95293000	2.57501600	5.25413500
26	26.95231000	3.12262400	132.20280000
27	29.02517000	2.01584800	99.22705000
28	29.95893000	3.50314100	216.52570000
29	30.54437000	3.26715600	88.15759000
30	31.01589000	3.51170500	312.96240000
31	31.09803000	1.24817800	173.83240000
32	42.92713000	2.52855500	189.03120000
33	44.02517000	2.14863500	47.05282000
34	57.42382000	4.67907900	174.45950000
35	59.06623000	2.09604100	9.53196700
36	86.40794000	5.05613000	185.87310000
37	87.49688000	0.50240230	124.09180000
38	115.93640000	3.55562200	235.18290000

Figur 18

gegevens getij tafel

	AMPLITUDE	FREQUENTIE	PHASE
K1	5.5	15.0411	350.15
O1	8.6	13.9430	162.56
	3.0	14.9589	335.24
M2	178.0	28.9841	297.02
S2	48.0	30.0000	212.00
N2	27.8	28.4397	240.86
K2	10.5	30.0821	65.42
M4	14.8	57.9682	241.13
MS4	7.4	58.9841	152.02

	AMPLITUDE	FREQUENTIE	PHASE
K1	6.1	15.0411	353.85
O1	9.6	13.9430	156.72
	3.1	27.8861	301.85
M2	174.9	28.9841	296.89
S2	46.8	30.0000	212.93
N2	28.5	28.4397	238.52
K2	11.6	30.0821	66.30
M4	13.1	57.9682	235.66
MS4	8.2	58.9841	147.20

gegevens KKM

figuur 19

	FREQ	AMPL. H	CORR FAC FN	ASTR ARG	KAPPA
K1	15.041	6.000	0.916	16.200	11.000
O1	13.943	10.000	0.863	6.500	190.000
	14.959	3.000	1.000	350.200	0.0
M2	28.984	173.000	1.029	25.000	60.000
S2	30.000	48.000	1.000	0.0	118.000
N2	28.440	27.000	1.029	305.300	36.000
K2	30.082	13.000	0.804	211.500	116.000
M4	57.968	14.000	1.059	52.100	113.000
MS4	58.984	7.000	1.059	26.000	175.000

figuur 20

I	T2(I)	A(I)	FI(I)
1	28.98410000	174.91580000	296.81980000
2	30.00000000	46.61810000	212.72190000
3	28.43969000	29.34098000	237.11690000
4	27.96820000	12.11351000	215.37600000
5	30.08210000	11.84691000	65.84939000
6	57.96820000	13.16305000	236.21330000
7	13.94299000	9.57084100	156.61980000
8	0.04106000	10.90888000	63.40910000
9	15.04100000	5.97871300	354.00310000
10	29.52839000	12.74406000	186.18030000
11	58.98410000	8.13420200	146.56390000

tabel bij a

I	T2(I)	A(I)	FI(I)
1	28.98410000	174.68120000	296.95800000
2	30.00000000	47.42866000	211.86710000
3	28.43969000	28.50540000	243.49780000
4	27.96820000	10.64601000	216.16270000
5	30.08210000	11.62455000	71.44033000
6	57.96820000	13.17546000	235.97700000
7	13.94299000	9.41516100	156.54170000
8	0.04106000	10.94720000	62.99955000
9	15.04100000	6.18630600	354.05150000
10	29.52839000	14.71085000	200.26790000
11	58.98410000	8.18583200	145.99540000

tabel bij b

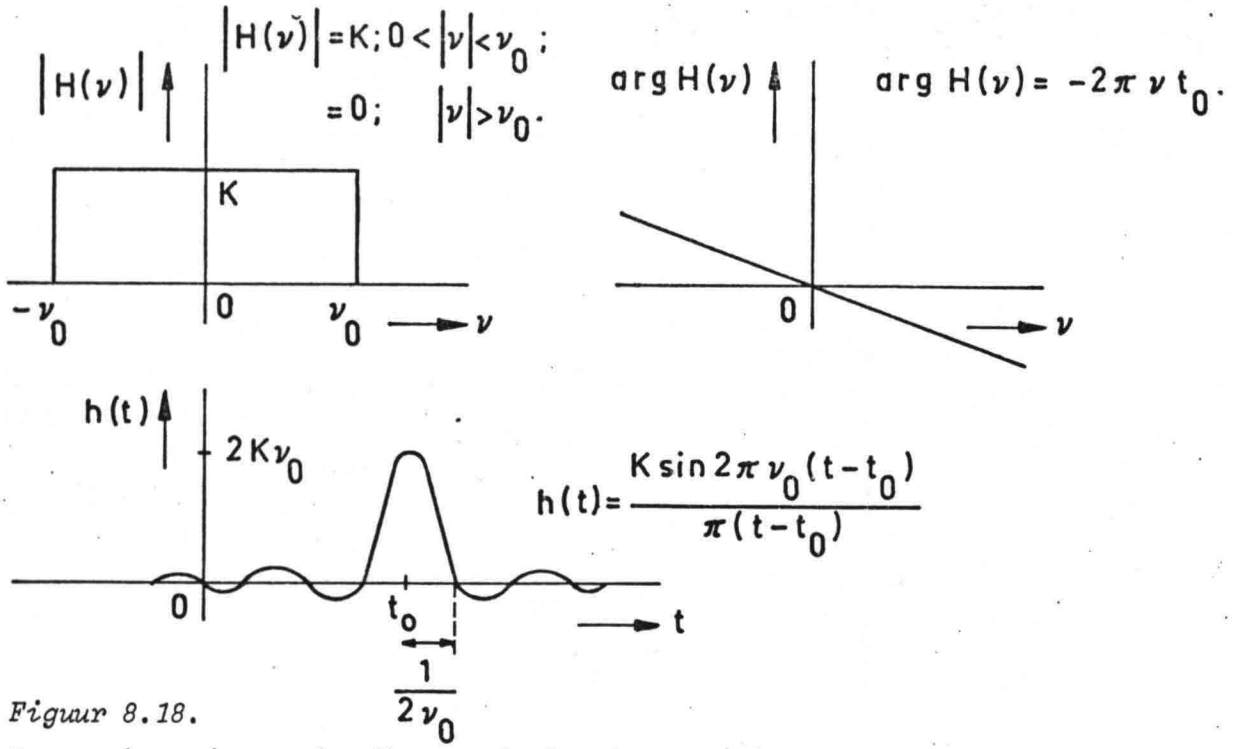
I	T2(I)	A(I)	FI(I)
1	28.98410000	174.91580000	296.81980000
2	30.00000000	47.34822000	211.31660000
3	28.43969000	28.42947000	243.26370000
4	27.96820000	10.73120000	215.94290000
5	30.08210000	11.90784000	72.39277000
6	57.96820000	13.21242000	236.20520000
7	13.94299000	9.48027500	156.56100000
8	0.04106000	10.95357000	62.93432000
9	15.04100000	6.19360100	354.02880000
10	29.52839000	14.71119000	200.27160000
11	58.98410000	8.18639200	145.98960000

tabel bij c

I	T2(I)	A(I)	FI(I)
1	28.98410000	174.90820000	296.88520000
2	30.00000000	46.79225000	212.93010000
3	28.43969000	28.46849000	238.51870000
4	27.96820000	12.17556000	216.40050000
5	30.08210000	11.62413000	66.29954000
6	57.96820000	13.05483000	235.66060000
7	13.94299000	9.62492500	156.71700000
8	0.04106000	10.98519000	63.08862000
9	15.04100000	6.07399500	353.85470000
10	29.52839000	12.22517000	183.68280000
11	58.98410000	8.15432800	147.19170000

tabel bij d

figuur 21



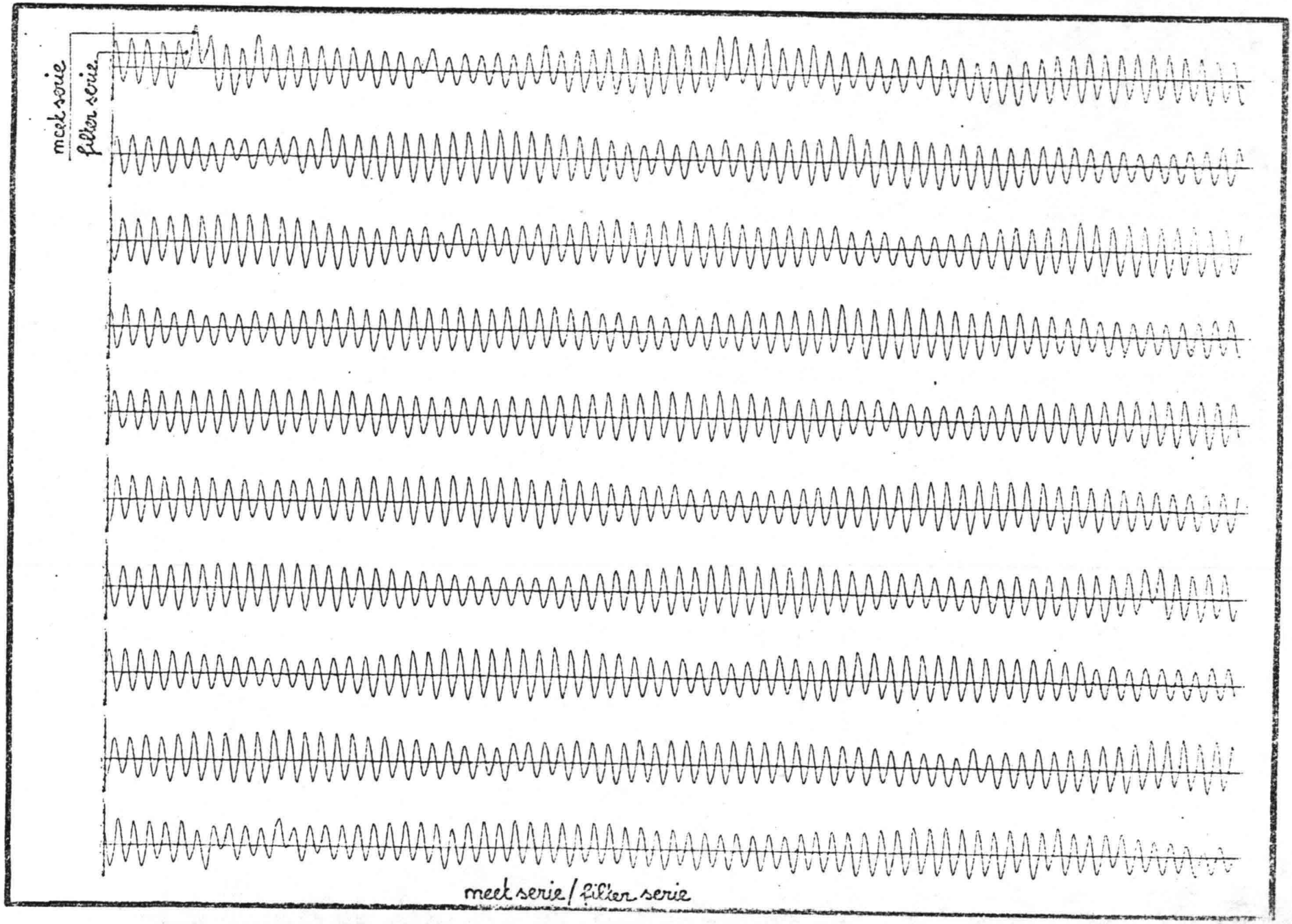
Figuur 8.18.

De overbrengingsverhouding en de impulsresponsie van een ideaal laagdoorlaatfilter.

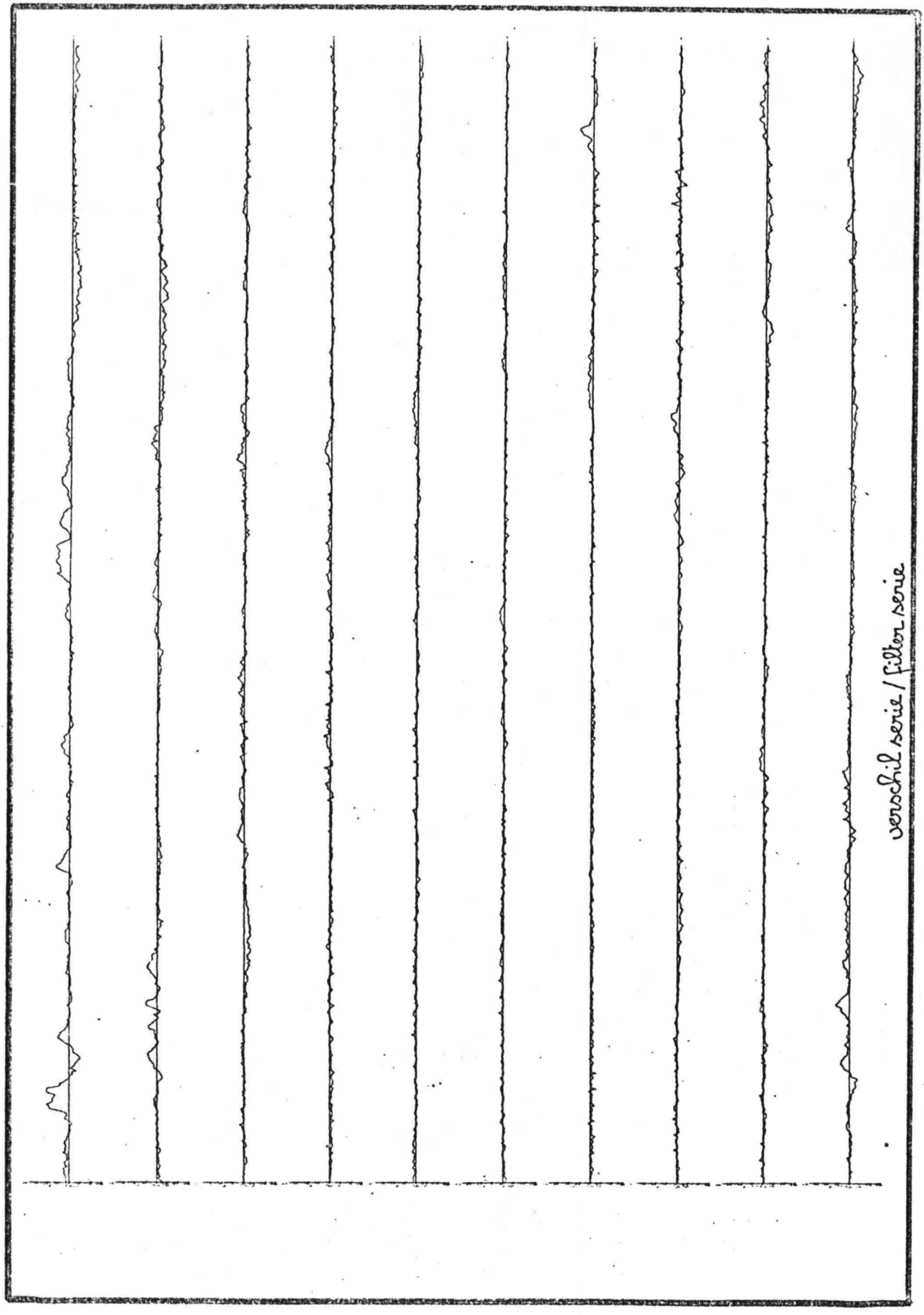
Figuur 22

```
DE GEWICHTS FACTOREN
  1       0.0
  2       0.01892063
  3      -0.00000016
  4      -0.02162368
  5      -0.01439198
  6       0.01559158
  7       0.02752094
  8      -0.00000017
  9      -0.03363682
 10      -0.02338712
 11       0.02672839
 12       0.05045508
 13      -0.00000026
 14      -0.07568270
 15      -0.06236576
 16       0.09354901
 17       0.30273068
 18       0.39999998
 19       0.30273068
 20       0.09354901
 21      -0.06236576
 22      -0.07568270
 23      -0.00000026
 24       0.05045508
 25       0.02672839
 26      -0.02338712
 27      -0.03363682
 28      -0.00000017
 29       0.02752094
 30       0.01559158
 31      -0.01439198
 32      -0.02162368
 33      -0.00000016
 34       0.01892063
 35       0.0

SOM VAN DE FACTOREN IS:1.0088091
```

Figuur 23

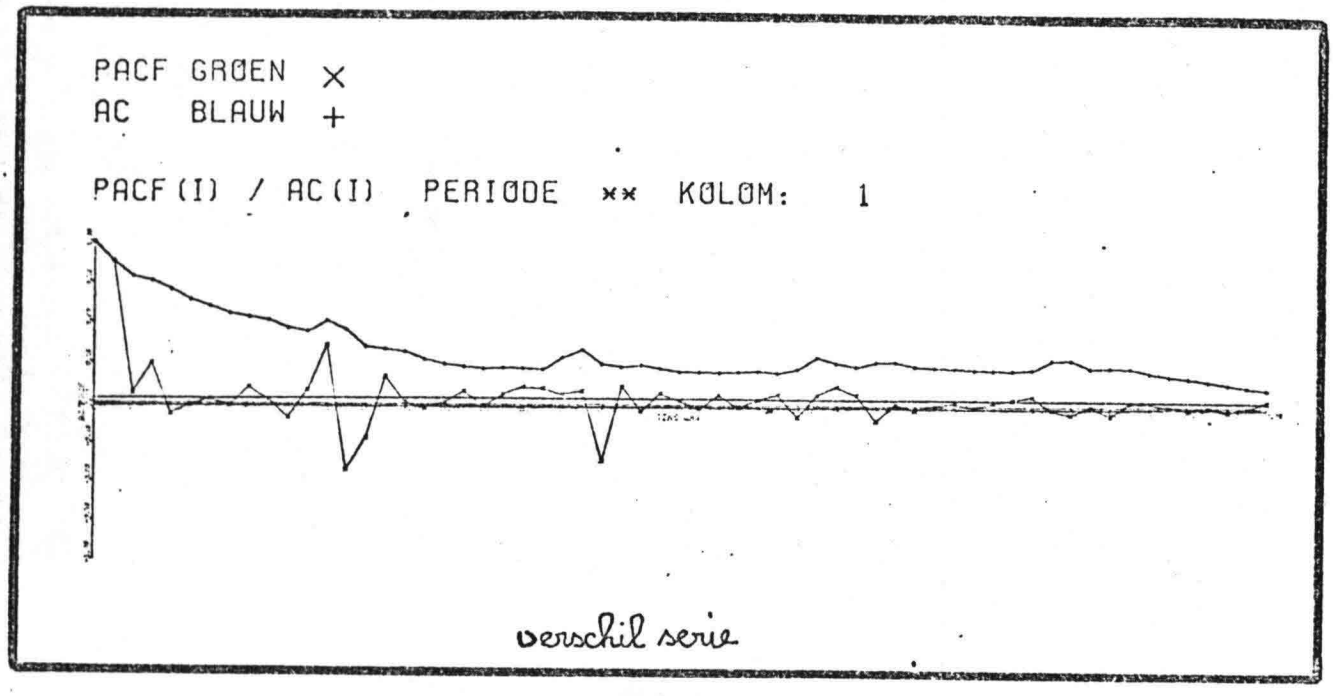


Figuur 24

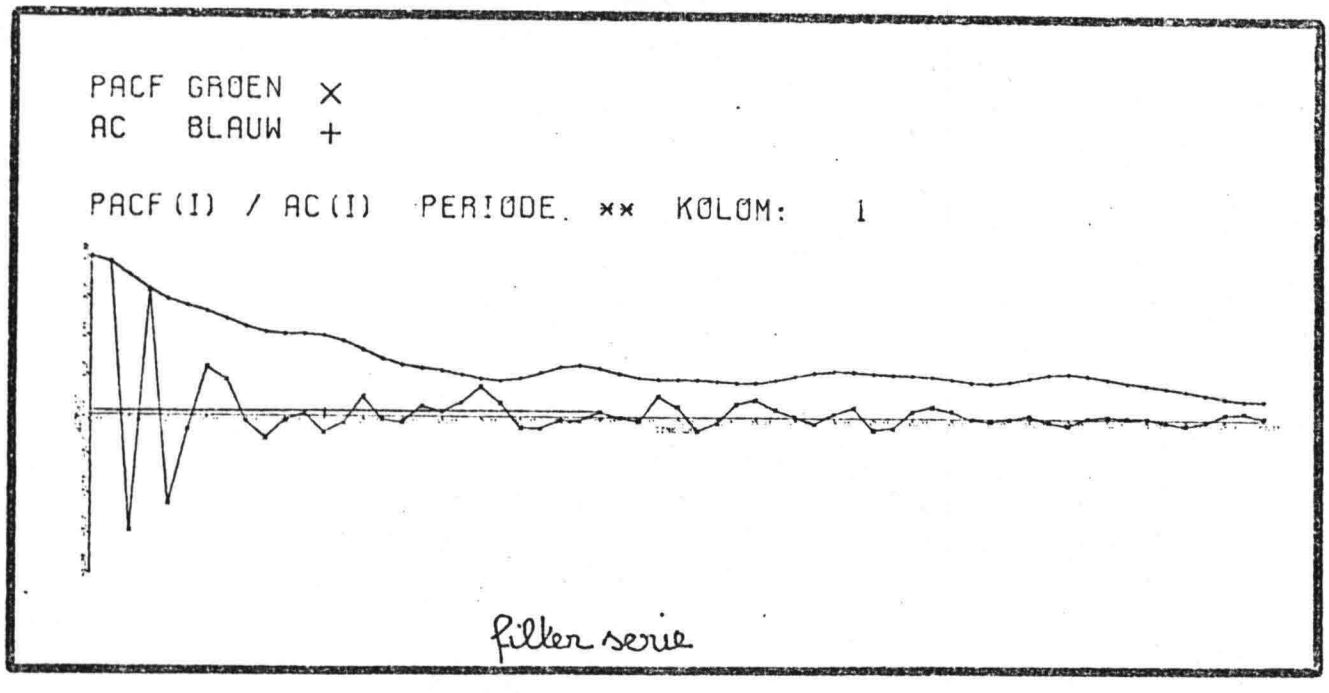


Figuur 25

Figuur 26



verschil serie



filter serie

Figuur 27

```
      22 DESCRIPTION FILTER
A DESCRIPTIVE ANALYSIS ON THE INPUT DATA VECTOR YIELDS THE FOLLOWING
MAXIMUM 226
MINIMUM ¯100.6
AVERAGE 0.1392
STD.DEV 23.772
RANGE   326.6
NO. OBS 8750

ENTER UPPER AND LOWER LIMITS IN VECTOR FORM,
IF THE COMPUTED MAX AND MIN ARE DESIRED ,ENTER 0
□:
      225 ¯105
FREQUENCY HISTOGRAM ; EACH STAR = 1 PERCENT
      LOWER       UPPER        NO,      REL,FREQUENCY IN PERCENT
    ¯105.00     ¯90.00          3
     ¯90.00     ¯75.00         12
     ¯75.00     ¯60.00         41
     ¯60.00     ¯45.00        126     *
     ¯45.00     ¯30.00        329     ****
     ¯30.00     ¯15.00       1337     ****************
     ¯15.00        .00       2886     ************************************
        .00      15.00       2411     ******************************
      15.00      30.00        954     ************
      30.00      45.00        379     ****
      45.00      60.00        106     *
      60.00      75.00         59     *
      75.00      90.00         36
      90.00     105.00         25
     105.00     120.00         17
     120.00     135.00         11
     135.00     150.00          5
     150.00     165.00          3
     165.00     180.00          3
     180.00     195.00          2
     195.00     210.00          3
     210.00     225.00          1

THE FOLLOWING ARE PERCENT AND NUMBER OUTSIDE INDICATED LIMITS
    ¯105.00         .00          0
     225.00         .01          1

THE MEDIAN IS              ¯1.75
THE MODE IS                ¯3.5203
THE VECTOR CONTAINS VALUES WHICH ARE ≤ 0, THE GEOMETRIC MEAN CANNOT BE COMPUTED,
0 IS AN ELEMENT OF THE DATA-VECTOR, THE HARMONIC MEAN CANNOT BE COMPUTED,
THE QUADRATIC MEAN IS    23.771
COEFFICIENT OF KURTOSIS 12.318
COEFFICIENT OF SKEWNESS 1.5534

DO YOU WANT A CUMULATIVE HISTOGRAM? Y/N

Y
CUMULATIVE FREQUENCY HISTOGRAM filter
      LOWER       UPPER        NO,      REL, CUMULATIVE FREQ, IN PERCENT
    ¯105.00     ¯90.00          3     *
     ¯90.00     ¯75.00         15     *
     ¯75.00     ¯60.00         56     *
     ¯60.00     ¯45.00        182     *
     ¯45.00     ¯30.00        511      *
     ¯30.00     ¯15.00       1848            *
     ¯15.00        .00       4734                    *
        .00      15.00       7145                            *
      15.00      30.00       8099                                *
      30.00      45.00       8478                                 *
      45.00      60.00       8584                                 *
      60.00      75.00       8643                                  *
      75.00      90.00       8679                                  *
      90.00     105.00       8704                                  *
     105.00     120.00       8721                                  *
     120.00     135.00       8732                                  *
     135.00     150.00       8737                                  *
     150.00     165.00       8740                                  *
     165.00     180.00       8743                                  *
     180.00     195.00       8745                                  *
     195.00     210.00       8748                                  *
     210.00     225.00       8749                                  *
```

figur 28

r0.4	3.2	0.7	79.3	74.7	70.1	2.3	71	73.9	714.9	713.7	78.8
2.3	8.9	3.3	73.7	77.4	79	71.1	71.1	79.9	711.2	712	78.8
2.9	9.2	3.9	2.9	73.9	74.2	0.8	4.8	3	74.7	711.8	711.8
74.9	3.7	7.3	3.9	73.9	78.9	74	70.9	72.7	78.9	714.9	714.3
79.2	71.3	4.3	4	71	79.3	78.3	72.8	0.9	0.3	74.3	78
78.7	70.8	9.9	7.7	3.9	71	72.8	71.9	71.2	74.2	77.8	78
74.7	70.2	3	3.8	1.9	72.8	78.7	78.7	73.1	0.9	0.4	79.2
712	714.8	711.9	74.8	70.1	0.9	71.8	73.9	79.3	73.8	712.3	714.3

Figuur 29

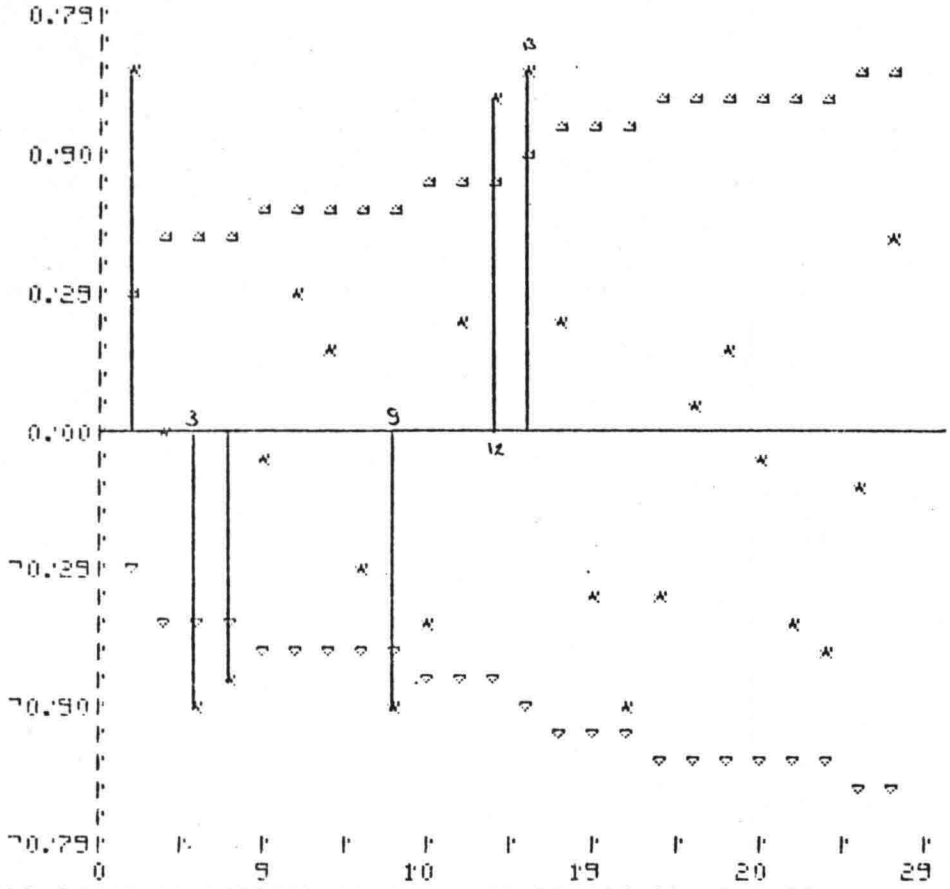
11	4	1	1	2	3	8	10	13	14	19	18
3	0	74	0	12	27	41	93	89	89	109	110
104	98	92	94	98	98	109	113	132	137	129	119
107	109	113	119	103	109	110	123	133	131	114	38
99	29	12	9	9	3	14	22	31	44	99	74

Figuur 30

```
      ***PLOTTING
      BOX 0
ENTER MAX. PLOTSIZE Y AND X OR 0 TO BYPASS ** 0

ENTER NO. INPUT SERIES FOR TRANSFER MODEL ANALYSIS, 0 FOR STOCHASTIC ONLY ** 0

   ***BEGINNING OF STOCHASTIC PROCESS ANALYSIS***
ENTER SERIES,( VALUES OR VECTOR NAME) ** X

TYPE 0,1,2,3,4,5,6 OR 7 FOR DESIRED TRANSFORMATION ** 0

    ***IDENTIFICATION SECTION***

INPUT MAX LAG FOR ACF                    ** 24
DIFF                    0          1          2          3

MEAN                72.241      .120       .090      -.030
S.E.                  .787       .814       .988       .993
VAR.                41.134     29.991     21.909     20.919
D.F.                    70         69         68         67
APPROX.
SE(ACF)              .120       .120       .121       .122
          LAG
            1        .887       .930       .931       .909
            2        .014       .284       .388       .419
            3        .490       .819       .903       .909
            4        .449       .992       .994       .988
            5        .099       .124       .218       .292
            6        .248       .847       .798       .809
            7        .149       .907       .818       .829
            8        .233       .141       .111       .104
            9        .498       .880       .730       .731
           10        .338       .999       .871       .887
           11        .179       .044       .011      -.003
           12        .822       .887       .877       .877
           13        .827       .710       .708       .703
           14        .192       .199       .099       .078
           15        .313       .479       .999       .978
           16        .493       .834       .876       .874
           17        .280       .219       .184       .189
           18        .090       .342       .438       .497
           19        .191       .928       .829       .848
           20        .068       .184       .238       .299
           21        .389       .393       .382       .383
           22        .419       .978       .823       .838
           23        .107       .269       .304       .329
           24        .344       .293       .292       .283
```

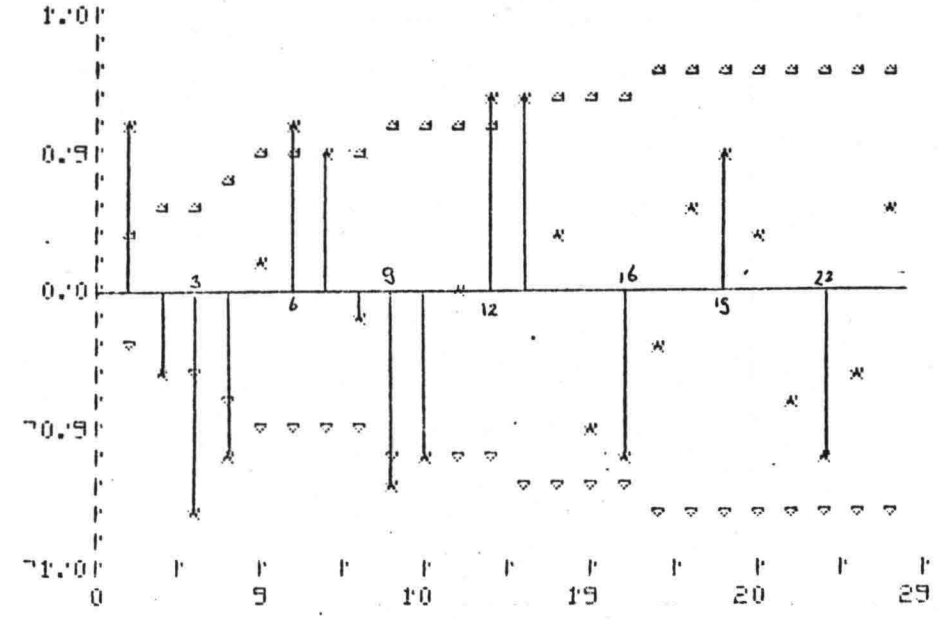
figuur 3.1

0
NEW PAGE?



A

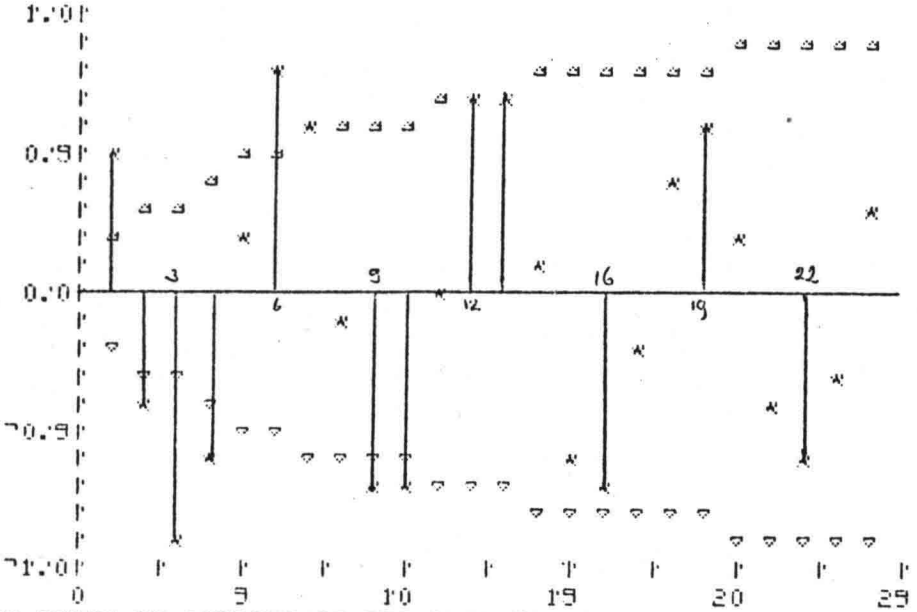
INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 1
NEW PAGE?



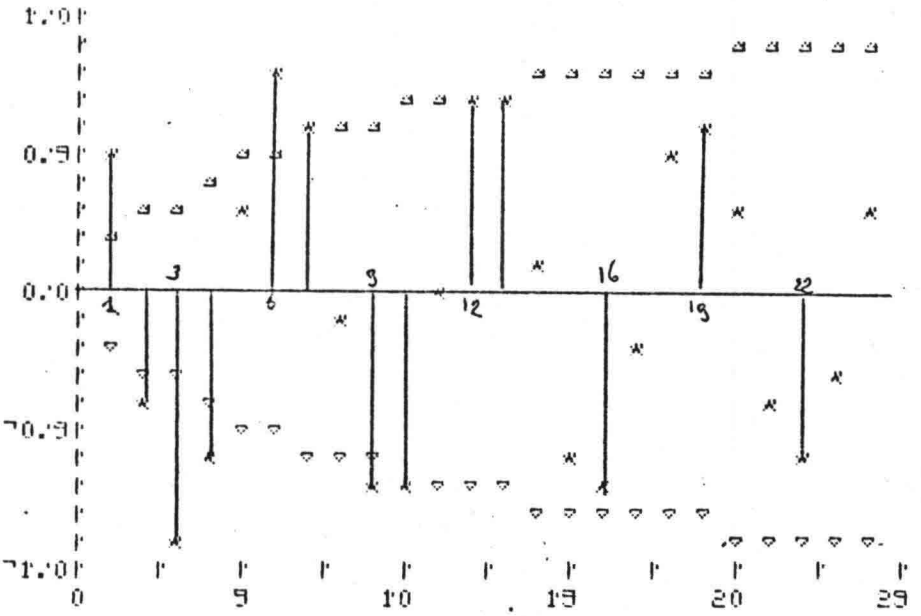
B

figuur 32

INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 2
NEW PAGE?



INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 3
NEW PAGE?



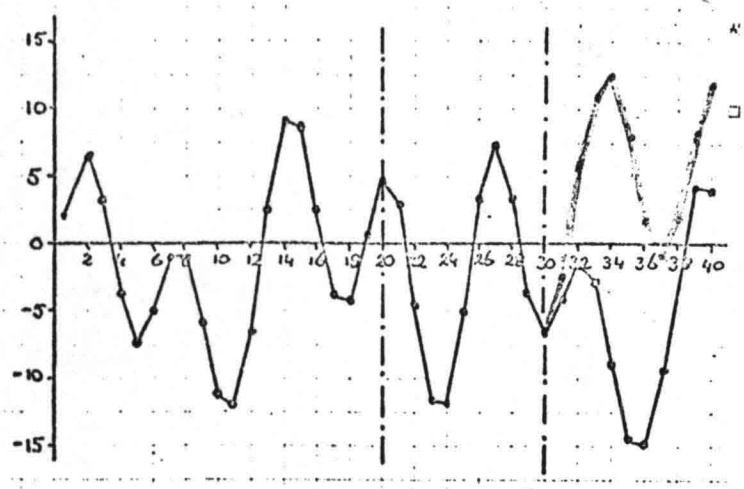
3 DIFFERENCES

10.4	8.2	0.7	-9.3	-4.7	-0.1	2.3	-1	-9.9	-14.9	-13.7	-8.8
2.3	8.3	3.3	-3.7	-7.4	-9	-1.1	-1.1	-9.9	-11.2	-13	-8.8
2.9	9.2	3.9	2.9	-3.9	-4.2	0.8	4.3	3	-4.7	-11.8	-11.9
-4.9	3.7	7.3	3.9	-3.9	-8.9	-4	-0.9	-2.7	-8.9	-14.9	-14.3
-9.2	-1.3	4.3	4	-1	-9.8	-8.3	-2.8	0.9	0.3	-4.3	-9
-8.7	-0.8	9.9	7.7	3.9	-1	-2.8	-1.9	-1.2	-4.2	-7.8	-8
-4.7	-0.2	3	3.8	1.9	-2.8	-8.7	-8.7	-3.1	0.9	0.4	-9.2
-12	-14.3	-11.9	-4.3	-0.1	0.9	-1.8	-3.9	-9.3	-8.8	-12.3	-14.3

figuur 33

Serie	gen.	model	AR	MA	resvar	sign.	
N10	44.2 / -26	(1 0 0)	.6	-	26.3	0.33	N1A
		(2 0 0)	1.1/-.9	-	2.5	0.37	N1B
		(6 0 3)		-.8 .8 .9	8.7	0.46	N1C
	38.0 / -1.						
		(2 1 0)	1.2 -.9		1.6	0.5	N1D
		(3 1 0)	1.9 -1.8 .7		1.1	0.4	N1E
N20	45. / .7	(1 0 0)	.7		26.2	0.0	N2A
		(2 0 0)	1.2 -.9		3.7	0.0	N2B
		(3 0 0)	2. -1.9 .8		1.4	0.39	N2C
	33.1 / .3						
		(2 1 0)	1.2 -.9		1.8	0.42	N2D
		(3 1 0)	1.9 -1.8 .8		.7	0.93	N2E
N30	38.7 / -1.6						
		(1 0 0)	.7		21.3	0	N3A
		(2 0 0)	1.2 -.9		4.2	0	N3B
		(3 0 0)	2. -1.9 .9		1.6	0	N3C
	27.1 / -.3						
		(2 1 0)	1.1 -.9		1.6	0	N3D
		(3 1 0)	1.9 -1.8 .8		.9	.41	N3E

figuur 34



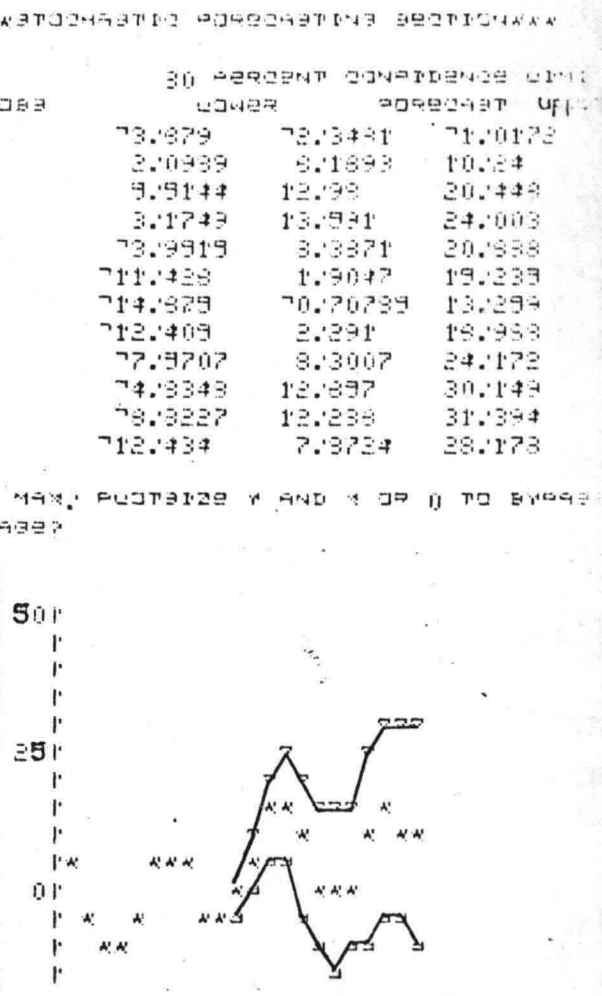
40 rest waarden rustige periode

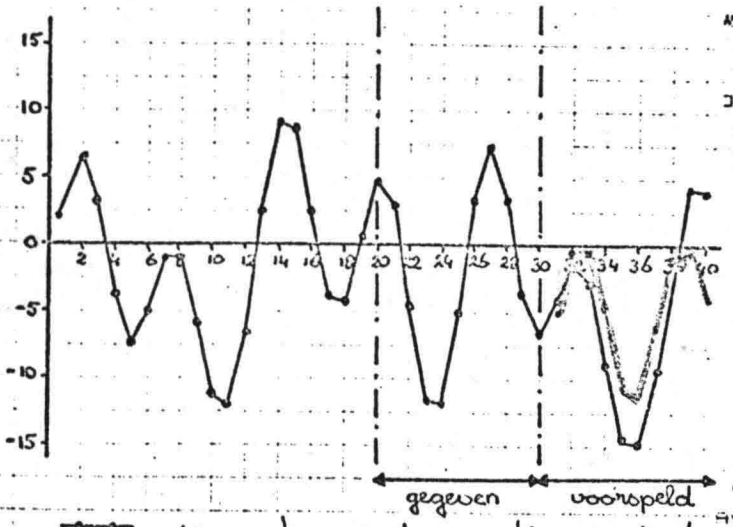
(3 1 0) AR: 1.89 -1.75 .66

res. var.: 1.08

signific.: 0.35

Figuur 35





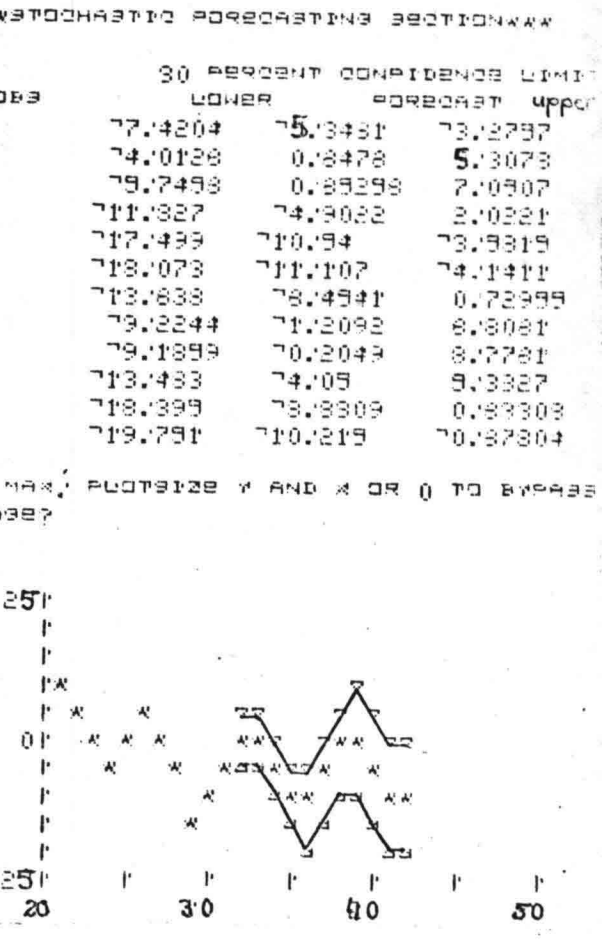
40 rest waarden rustige periode

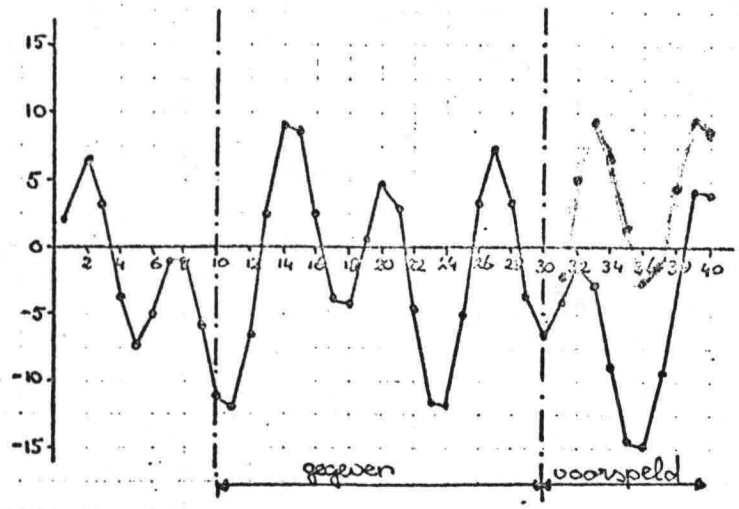
(2 1 0) AR: 1.01 -.93

res var: 2.6

signific.: 0.71

figuur 36



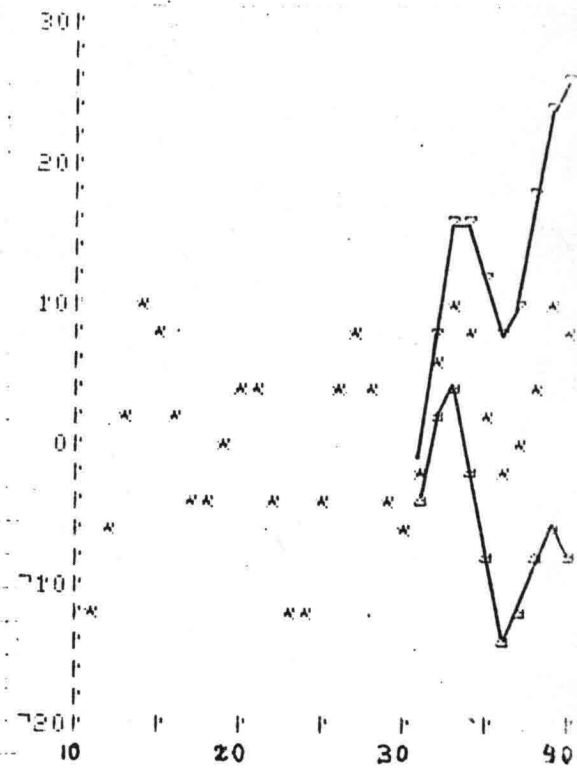


40 rest waarden rustige periode

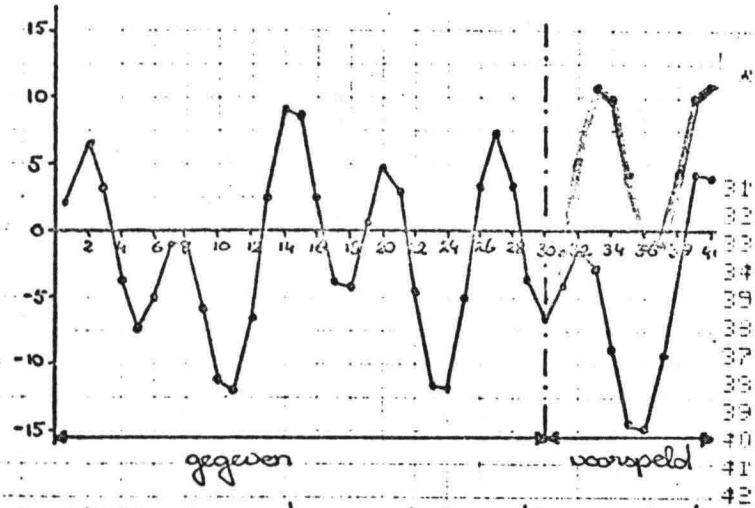
(3.1.0) AR: 1.88 -1.81 0.79

res.var.: 0.74

signific.: 0.32



figuur 37



40 rest waarden rustige periode

(3.1.0) AR: 1.9 -1.8 .8

res.var.: 0.9

signific.: 0.41

```
***STOCHASTIC FORECASTING SECTION***

                    30 PERCENT CONFIDENCE L
OBS        LOWER          FORECAST
 31    -3.9442         -2.3393         -1.175
 32     2.0398          9.8724          9.308
 33     4.9027         11.198          17.914
 34     0.8702         10.13           19.391
 35    -8.7007          4.2828         19.266
 36   -12.389          -0.32229        11.221
 37   -13.819          -0.88314        12.243
 38    -9.8873          4.4343         19.996
 39    -9.7801         10.094          29.969
 40    -8.177          11.949          29.276
 41   -11.303          8.0938          27.41
 42   -17.931          2.9379          23.496
```

figuur 38

```
      DIRECT
ENTER MAX. POSITIVE P AND Q OR 0 TO BYPASS ** 0

INPUT REG. DIFF.  SEAS. PERIOD, AND SEAS. DIFF  IN VECTOR FORM.
ENTER ABOVE VECTOR      **

                              1 0 0
ENTER INPUT SERIES         ** ENTER
ENTER 0,7 FOR INFORMATION ** 0
ENTER AR TERMS             ** 1.9 -1.3 .8   gegeven
ENTER MA TERMS             ** 0
ENTER EPS AND EPS2 OR 0 TO BYPASS ** 0


ENTER 1 OR 0 FOR CONST   ** 1
        MAX          MIN          MEAN         VAR.         S.E.         N
      9.100       -7.700       -.280       20.190        .481         99

   **FINAL FITTING SECTION**

ENTER EPS AND EPS2 OR 0 TO BYPASS ** 0

CONVERGENCE IS ASSUMED AT ITERATION NO: 9
NUMBER OF ITERATIONS PERFORMED        : 8
THE RESIDUAL VARIANCE IS              :  0.78331 <----

FINAL AR ESTIMATES          1.8421 -1.7849 0.73987  berekend
FINAL MA ESTIMATES
FINAL ESTIMATE FOR MEAN     -0.17897
FINAL ESTIMATE FOR CONSTANT -0.032883


ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES ** INPUT IS NOT NUMERIC, TRY AGAIN
ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES ** .8
                COEFFICIENT                  STANDARD(B)     CONFIDENCE INTERVAL
      TERM         B            STD(B)          T          LOWER          UPPER
       1         1.842           .072         29.928         1.790          1.933
       2        -1.789           .082        -21.402        -1.871         -1.689
       3          .740           .089         11.329          .898           .824
       4         -.179           .494          -.382         -.311          .494
CORRELATION MATRIX
   1          -0.97874     0.98788     -0.023
 -0.97874      1          -0.98809      0.018989
  0.98788     -0.98809     1           -0.0092881
 -0.023        0.018989   -0.0092881   1

   **DIAGNOSTIC SECTION ON RESIDUALS**
THE CHI SQUARE STATISTIC = 120.4  WITH 21 DEGREES OF FREEDOM
THE LEVEL OF SIGNIFICANCE (1-CHISQUARE PROBABILITY)= 0 <----
INPUT MAX LAG FOR ACF              ** 8
DIFF                    0

MEAN                   -.008
S.E.                    .087
VAR.                    .723
D.F.                     99
APPROX.
SE(ACF)                 .103
          LAG
           1          .388
           2         -.092
           3         -.197
           4         -.188
           5         -.109
           6          .424
           7          .294
           8         -.193
```

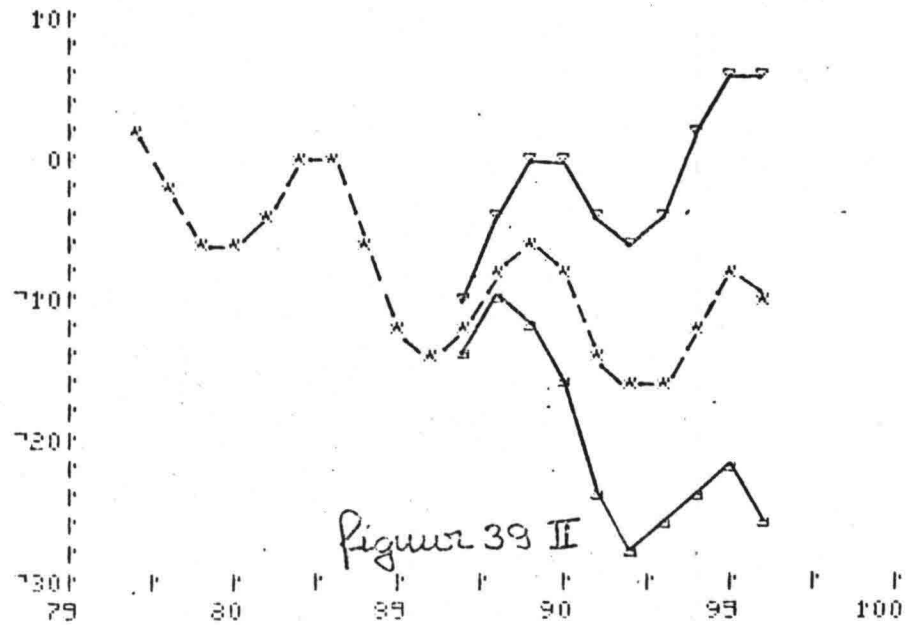
(310)

gegeven

Figuur 39 I

```
INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 0
NEW PAGE?

      0.91F
          F *
          F                 B B
          F B B B B B B
          F
      0.01F
          F   *     *
          F ? ? * * ? ?   *
          F               * ?
          F             *
     -0.91F     F     F     F     F
          0           5          10
INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 999


INPUT MAX HARMONIC FOR PERIODOGRAM ** 0

TYPE 1 IF SATISFIED WITH MODEL, 0 TO RETURN TO SPECIFICATION ** 1


   ***STOCHASTIC FORECASTING SECTION***

ENTER VECTOR OF: LEADS ,ORIGIN,AND CONFIDENCE COEFFICIENT ** 10 88 .9

                 90 PERCENT CONFIDENCE LIMITS
   OBS            LOWER        FORECAST          UPPER
   87          -13.271        -12.133        -10.994
   88          -10.772         -7.341         -3.910
 * 89          -11.489         -5.328          .913
   90          -10.472         -4.131          .211
   91          -13.040         -8.340         -3.640
   92          -17.044        -12.029         -7.014
   93          -18.987        -13.317         -7.648
   94          -13.717         -6.342          1.032
   95          -12.433         -3.993          4.377
   98          -15.112         -5.989          3.982

INPUT NO OF OBSERVATIONS PRECEDING FORECAST FOR PLOT
ENTER MAX, PLOTSIZE * AND * OR 0 TO BYPASS ** 0
NEW PAGE?
```

obs	original	forecast	± Δ
87	-11.5	-12.13	1.14
88	-4.8	-7.34	3.43
89	-0.1	-5.33	6.14
90	0.5	-4.13	9.34
91	-1.6	-13.34	9.7
92	-3.5	-16.53	
93	-5.3	-15.32	⋮
94	-6.6	-11.34	
95	-12.3	-6.55	
96	-14.3	-9.57	15.55



Figur 39 II

```
      PROB. 42 DATA REG
SAVED 13:11:13 03/14/73
      ORIGINAL
      ORIGINAL
      RAPIDLY RESIDUALS ED
        MAX          MIN          MEAN          VAR.          S.E.          N
      1.727        -2.418        -.010          .717          .038          38
ENTER DESIRED NO. RESIDUALS (-N TAKES LAST N, N TAKES FIRST N, OR ALL= ** -24
```

	OBSERVED	COMPUTED	RESIDUAL	STANDARDIZED RES.
73	-4.700	-4.983	.283	.341
74	-.200	-.483	.283	.311
75	3.000	1.937	1.063	1.298
76	3.300	3.382	-.433	-.918
77	1.900	2.923	-1.423	-1.880
78	-2.800	-1.814	-.986	-1.189
79	-6.700	-6.103	-.597	-.708
80	-6.700	-8.030	1.330	1.970
81	-3.100	-3.031	-.089	-.031
82	.900	.813	-.113	-.134
83	.400	.749	-.349	-.408
84	-9.200	-8.907	-1.893	-1.999
85	-12.000	-12.708	.708	.837
86	-14.800	-14.790	-.090	-.080
87	-11.900	-12.133	.633	.747
88	-4.800	-9.943	.743	.878
89	-.100	-.388	.288	.338
90	.900	-.393	1.393	1.804
91	-1.800	-1.789	-.189	-.199
92	-3.900	-3.083	-.417	-.493
93	-9.300	-2.882	-2.418	-2.399
94	-8.800	-8.349	-1.751	-2.088
95	-12.300	-12.941	.841	.797
96	-14.300	-14.898	.398	.421

*** = ORIGINAL SERIES 000 = COMPUTED SERIES

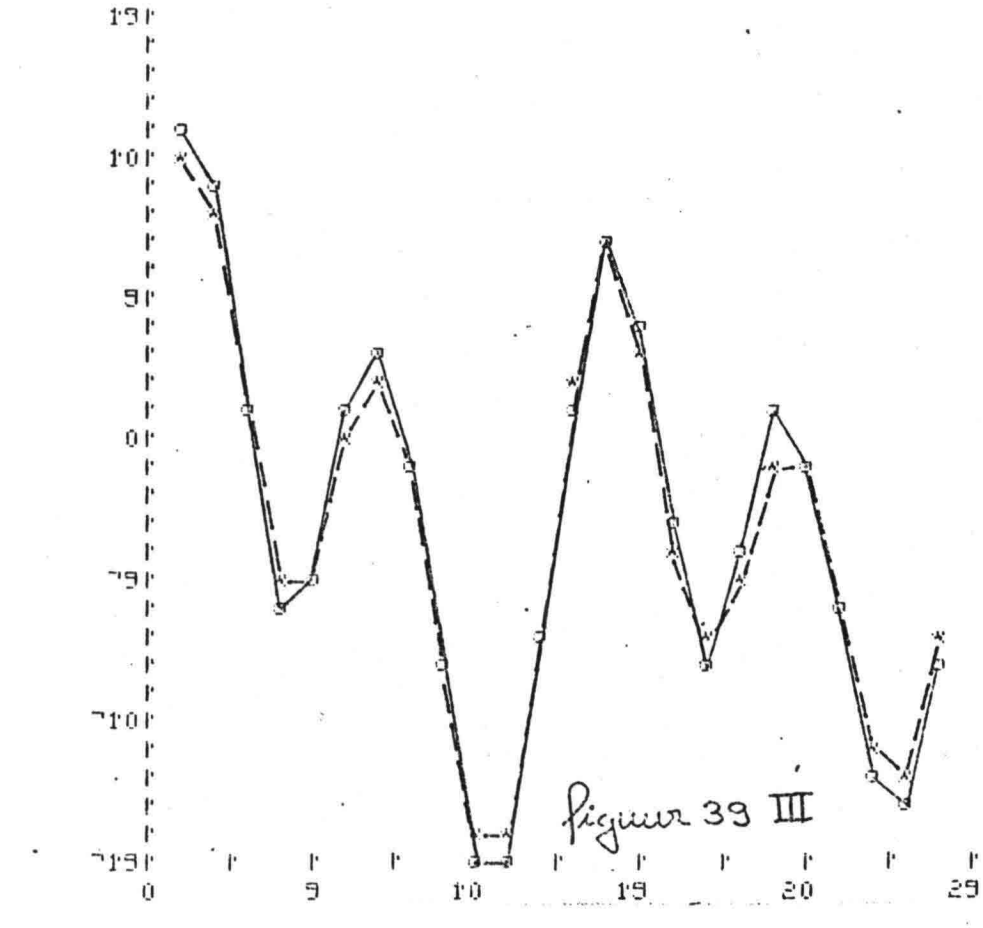


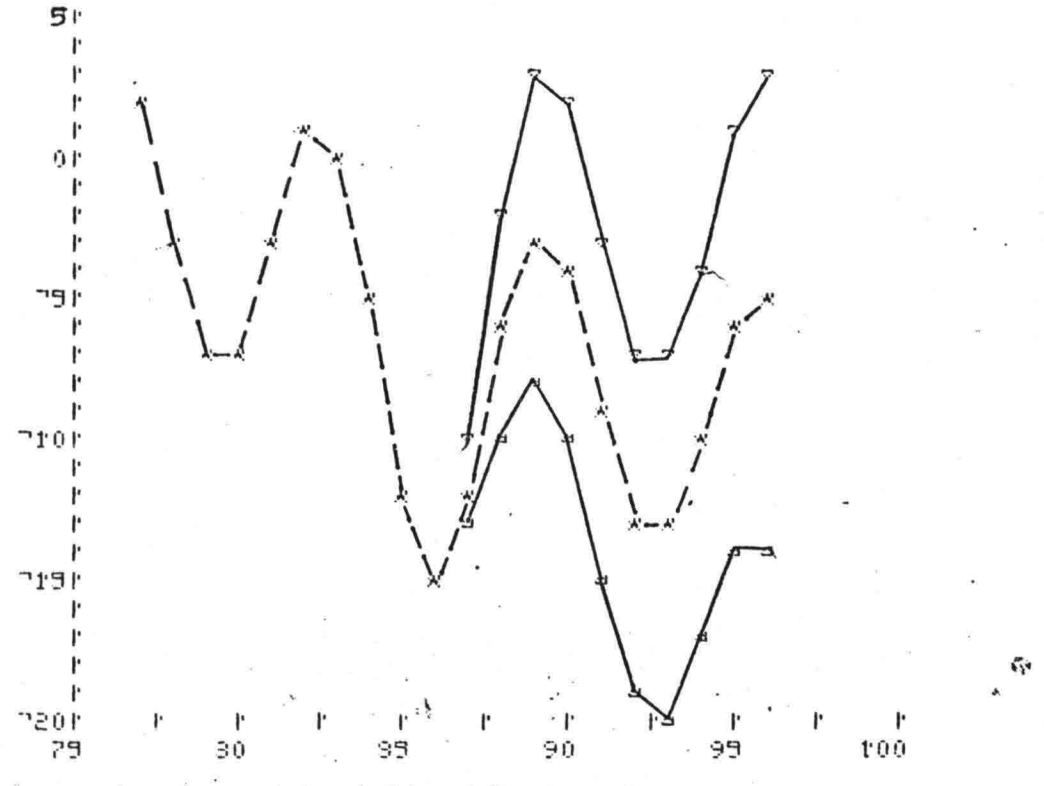
Figure 39 III

```
      DIFF2?
ENTER MAX. POWERS P AND Q OR 0 TO BYPASS ** 0

INPUT SIG. DIFF.   SEAS. PERIOD.  AND SEAS. DIFF  IN VECTOR FORM.
ENTER ABOVE VECTOR          ** 1 0 0
ENTER INPUT SERIES          ** FILTER
ENTER 0=? FOR INFORMATION ** 0                    (210)
ENTER AR TERMS              ** 1.01 -.93   gegeven
ENTER MA TERMS              ** 0
ENTER EPS AND EPS2 OR 0 TO BYPASS ** 0


ENTER 1 OR 0 FOR CONST    ** 1
      MAX          MIN          MEAN         VAR.         S.E.         N
     9.100       -7.700       -.280       20.190         .481         99

   ***FINAL FITTING SECTION***

ENTER EPS AND EPS2 OR 0 TO BYPASS ** 0
CONVERGENCE IS ASSUMED AT ITERATION NO: 9
NUMBER OF ITERATIONS PERFORMED          : 8
THE RESIDUAL VARIANCE IS                :  1.5773 ←


FINAL AR ESTIMATES              1.1 -.90389   berekend
FINAL MA ESTIMATES
FINAL ESTIMATE FOR MEAN         -.19233
FINAL ESTIMATE FOR CONSTANT     -.12293


ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES ** .8
                  COEFFICIENT                    STANDARD(B)     CONFIDENCE INTERVAL
      TERM            B           SIGMA(B)          T            LOWER          UPPER
         1          1.100            .028        41.311          1.068          1.134
         2          -.903            .028       -39.390          -.939          -.870
         3          -.193            .189         -.929          -.384           .089
CORRELATION MATRIX
  1          -0.43893   -0.019919
 -0.43893     1          0.018813
 -0.019919    0.018813   1

   ***DIAGNOSTIC SECTION ON RESIDUALS***
THE CHI SQUARE STATISTIC = 298.33  WITH 22 DEGREES OF FREEDOM
THE LEVEL OF SIGNIFICANCE (1-CHISQUARE PROBABILITY)= 0 ←
INPUT MAX LAG FOR ACF              ** 8
DIFF                    0

MEAN                 -.002
S.E.                  .129
VAR.                 1.489
D.F.                    99
APPROX.
SE(ACF)               .103
        LAG
          1          .873
          2          .174
          3         -.188
          4         -.288
          5         -.312
          6         -.401
          7         -.391
          8         -.299
```

figuur 40 I

```
INPUT MAX HARMONIC FOR PERIODOGRAM ** 0

TYPE 1 IF SATISFIED WITH MODEL, 0 TO RETURN TO SPECIFICATION ** 1


   ***STOCHASTIC FORECASTING SECTION***

ENTER VECTOR OF: LEADS ,ORIGIN,AND CONFIDENCE COEFFICIENT ** 10 88 .8

                  80 PERCENT CONFIDENCE LIMITS
  OBS          LOWER          FORECAST          UPPER
   87       710.474        711.884        710.299
   88        79.974         78.230         72.488
   89        73.194         72.808          2.883
   90       710.329         74.247          1.839
   91       719.249         79.048         72.844
   92       719.383        713.148         78.933
   93       719.737        713.449         77.161
   94       718.339        710.201         73.907
   95       713.932         78.479           .974
   96       713.927         79.439          2.943

INPUT NO OF OBSERVATIONS PRECEDING FORECAST FOR PLOT
ENTER MAX, PLOTSIZE Y AND X OR 0 TO BYPASS ** 0
NEW PAGE?
```

OBS	original	forecast	±Δ
87	-11.5	-11.86	1.6
88	- 4.8	-6.23	3.74
89	-0.1	-2.81	5.38
90	0.5	-4.25	6.08
91	-1.6	-8.05	
92	-3.5	-13.15	
93	-5.3	-13.45	
94	-8.6	-10.20	
95	-12.3	-6.48	
96	-14.3	-5.44	8.09



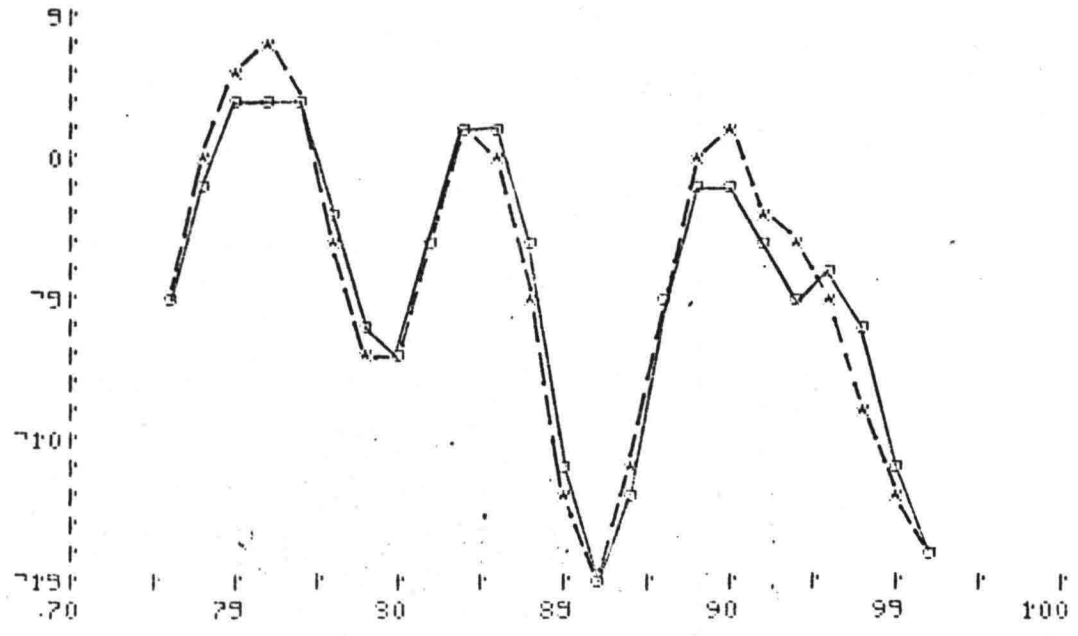
figuur 40 II

```
ZOOZOOUO
RUPTUTER RESIDUALS 22
      MAX          MIN          MEAN          VAR.          S.D.          N
    2.931        -2.912        -.001         1.489          .124         98
ENTER DESIRED NO. RESIDUALS (-N TAKES LAST N, N TAKES FIRST N, OR ANY XX -24
```

	OBSERVED	COMPUTED	RESIDUAL	STANDARDIZED RES.
73	-4.700	-3.494	-.794	-.899
74	-.200	-.832	.832	.921
75	3.000	1.648	1.352	1.119
76	3.800	2.339	1.489	1.208
77	1.900	1.889	-.189	-.139
78	-2.300	-1.375	-.925	-.783
79	-6.700	-5.576	-1.124	-.927
80	-6.700	-7.231	.931	.438
81	-3.100	-3.302	.202	.187
82	.900	.737	-.237	-.198
83	.400	1.088	-.888	-.987
84	-9.200	-3.082	-2.118	-1.747
85	-12.000	-11.392	-.908	-.901
86	-14.800	-14.948	-.292	-.208
87	-11.900	-11.384	.384	.301
88	-4.900	-5.489	.889	.949
89	-.100	-.932	.432	.398
90	.900	-1.101	1.801	1.321
91	-1.800	-3.209	1.809	1.324
92	-3.900	-4.974	1.074	.886
93	-9.300	-5.817	-3.483	-1.223
94	-3.800	-5.838	-2.912	-2.403
95	-12.300	-10.728	-1.972	-1.297
96	-14.300	-13.914	-.788	-.849

```
ENTER NO . POINTS TO PLOT ORIGINAL VRS COMPUTED,AS ABOVE OR 0 XX -24
ENTER MAX. PLOTSIZE # AND # OR 0 TO BYPASS XX 0
SPACE TO NEXT PAGE THEN PRESS RETURN
```

WWW = ORIGINAL SERIES OOO = COMPUTED SERIES



figuur 40 III

```
 12 BPR
 0.097483  -0.34739   -1.1412    0.33866   0.98242   -1.3939   -1.9997   -1.884
-1.9309    -0.80829   0.79242    0.32893   1.9349    0.94138   0.33888   0.453
 1.234     0.27379    -1.9973    -2.0008   -1.1988   0.10263   0.8197    1.8134
 2.9808    1.8873     0.88729    0.10071   0.4913    1.0394    -0.92498  -1.2281
-1.9844    -1.809     0.087792   0.98187   1.0141    0.99221   0.49134   0.1294
 0.99233   1.3924     -0.3982    -2.3994   -2.8308   -1.299    -0.28223  0.3894
 0.99799   1.9919     2.0878     0.79401   0.90779   0.99192   0.38919   0.0367
-0.89883   -0.98733   -0.89791   0.94101   1.3403    1.4927    1.0882    0.2791
 0.2102    1.0279     0.28239    -1.0209   -2.8322   -2.0333   0.29349   0.7941
 0.79392   0.83183    1.3918     1.4843    -0.1887   -0.92919  -1.1238   0.9810
 0.20217   -0.23729   -0.83799   -2.1178   -0.80789  -0.29247  0.38434   0.8851
 0.43183   1.8003     1.8093     1.0743    -1.483    -2.9129   -1.9722   -0.7982
```

Rest serie

```
 0 BPLOT 1
ENTER MAX. PLOTSIZE Y AND X OR 0 TO BYPASS XX 39 79
INPUT YOUR SERIES XX 89TR
        MAX          MIN          MEAN         VAR.         S.D.         N.
      2.991        -2.331         .083        1.429         .148         89
NEW PAGE?
```

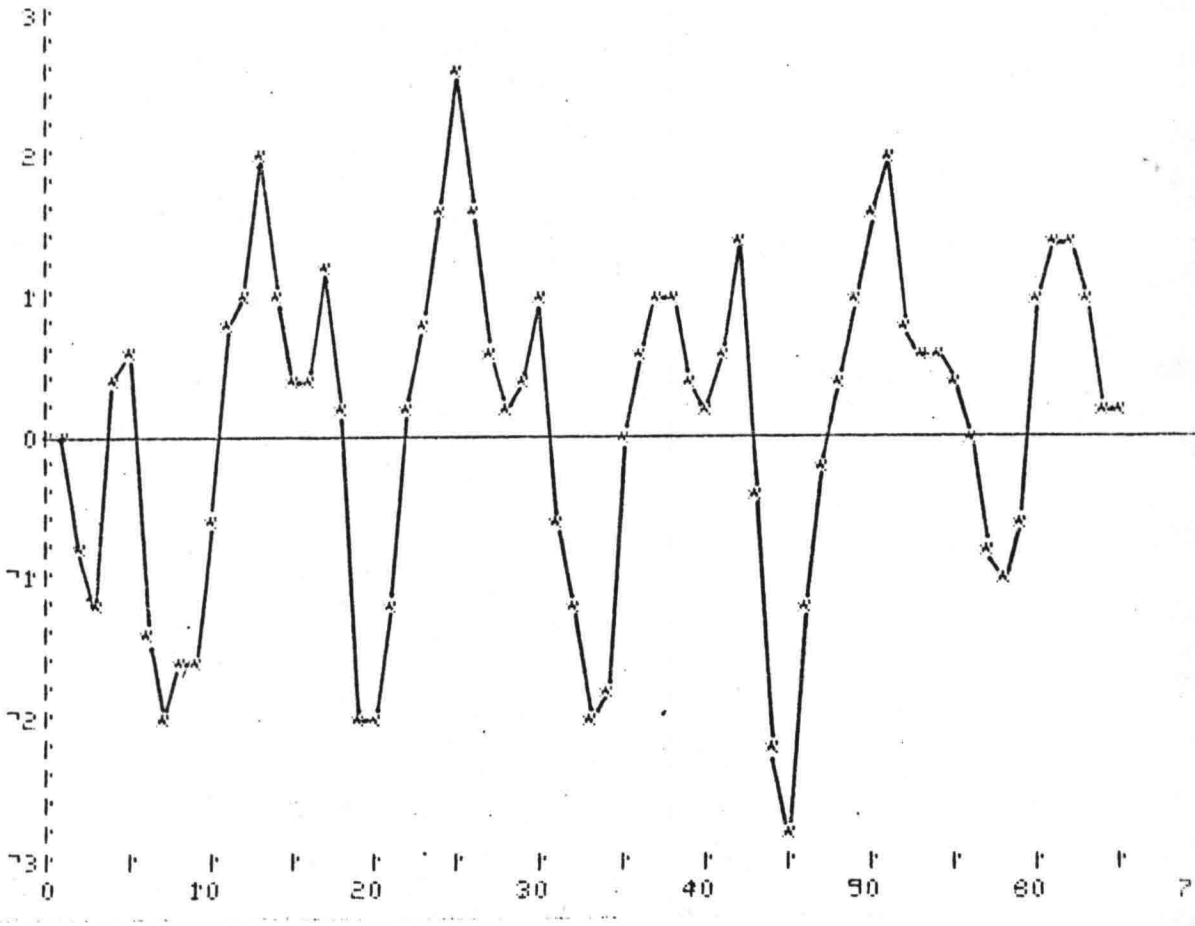
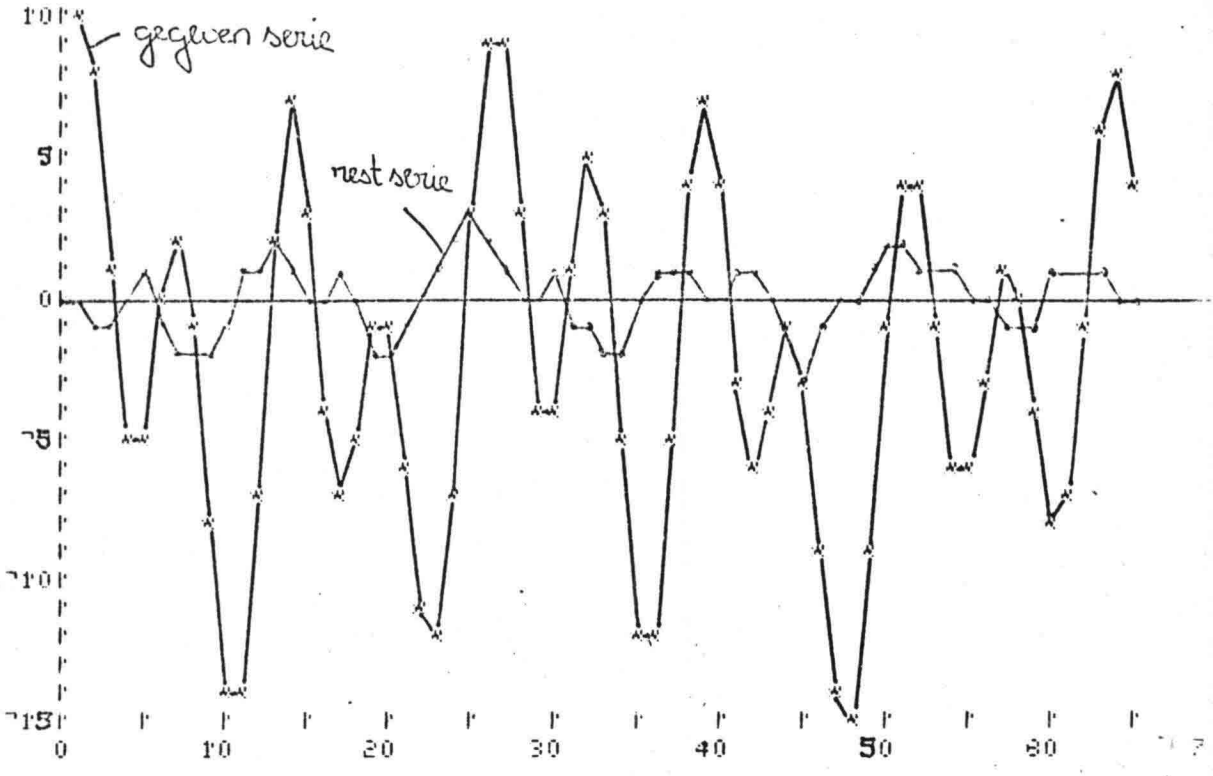


figure 40 IV

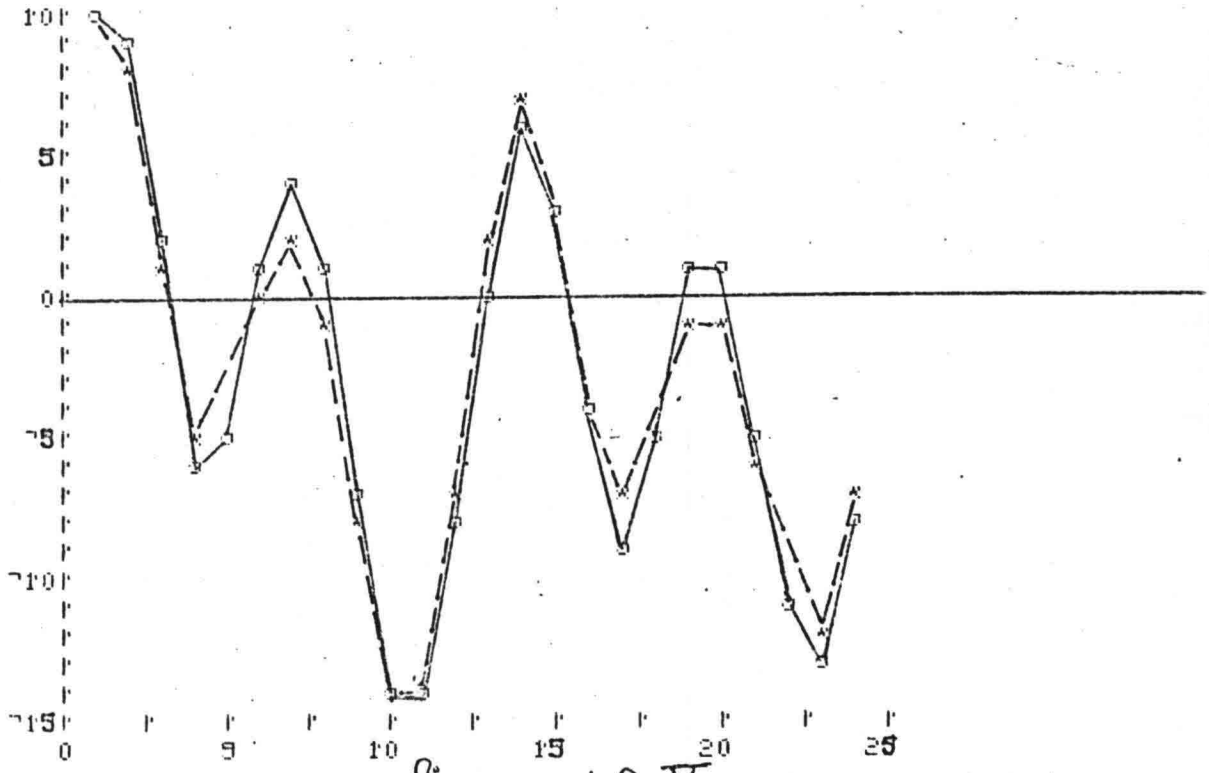
INPUT NOW SERIES ** SEPTEMBER

MAX	MIN	MEAN	VAR.	S.E.	N
10.400	-14.300	-2.222	40.349	.790	89

NEW PAGE?



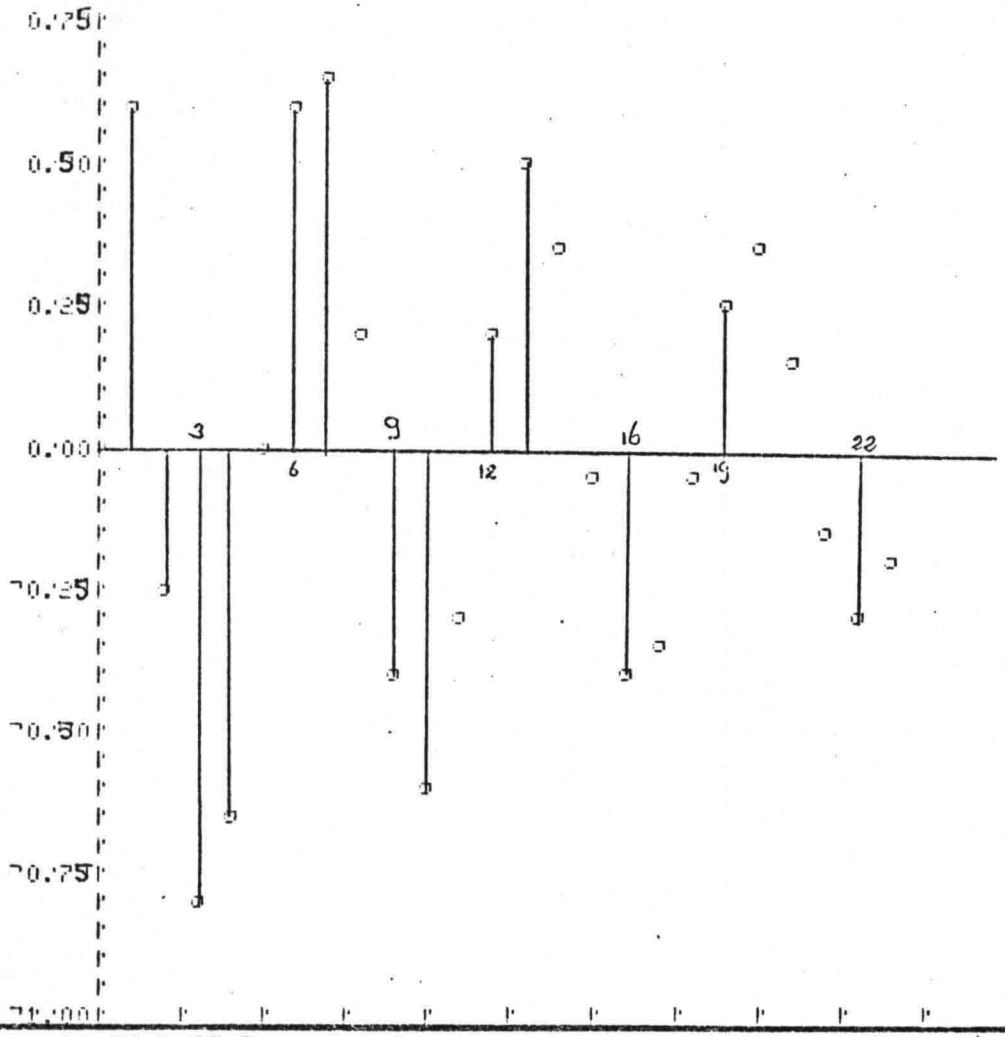
*** = ORIGINAL SERIES ooo = COMPUTED SERIES



figuur 40 V

```
      ∇PLOT
[1]   ⍝ PLOT
[2]   ⍝ R←1.84 ¯1.76 0.74 YULWAL 24
[3]   ⍝ R←1.1 ¯0.30 YULWAL 24
[4]   □PP←30
[5]   40 79 PLOT R
```

(210)




```
      20 79 PLOT R
```

R← 1.84 ¯1.76 0.74 YULWAL 24

(310)

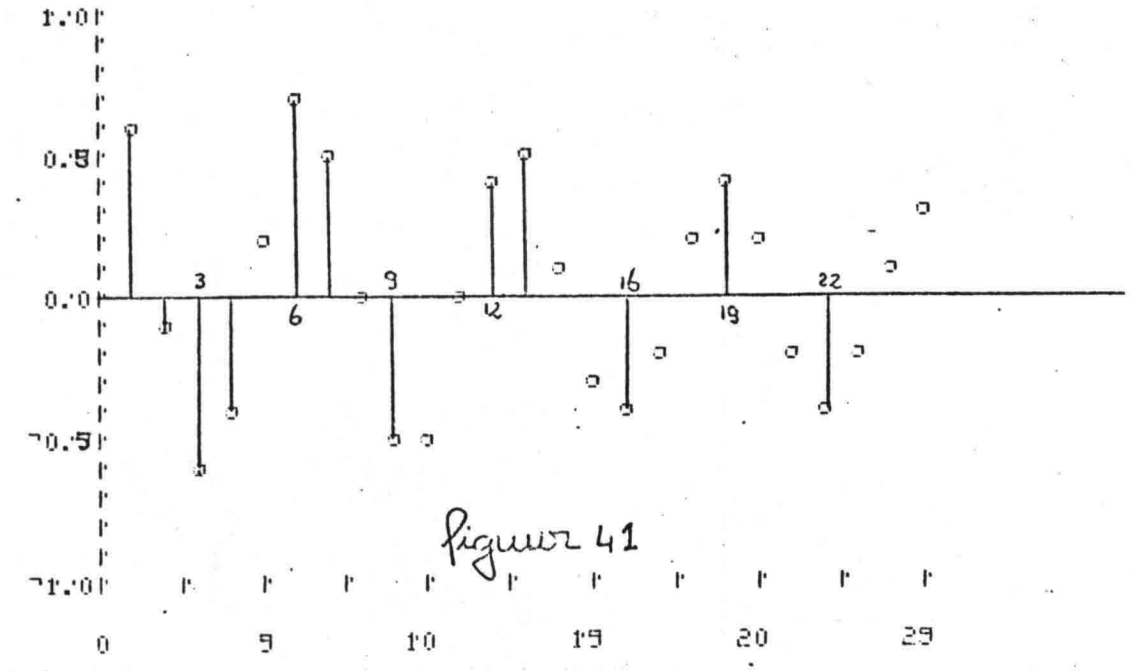
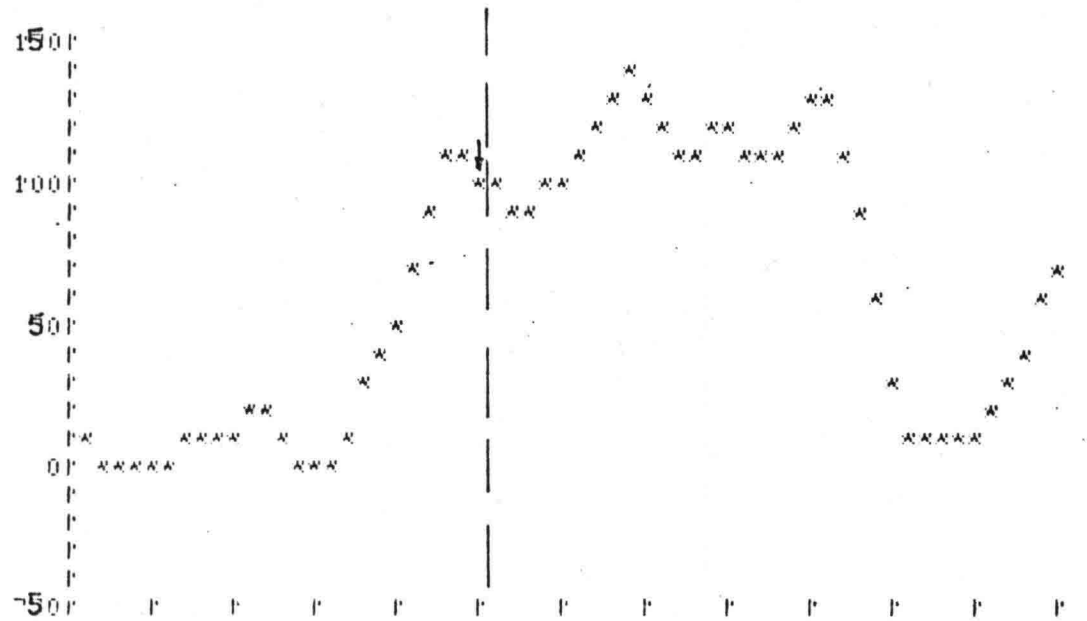
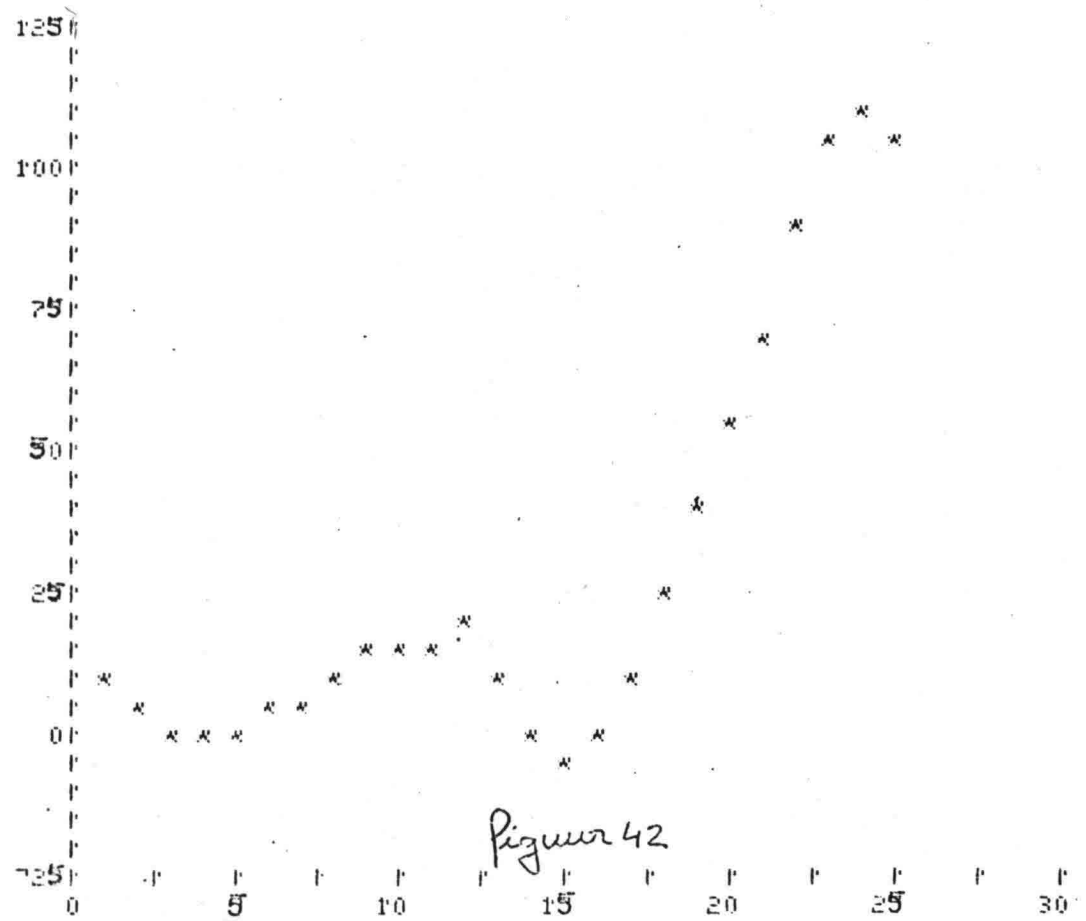


figure 41

```
0 PLOT 1
ENTER MIN, OUTSIDE X AND 1 OR 0 TO BYPASS ** 35 80
INPUT YOUR SERIES ** 31
        MAX             MIN             MEAN            VAR.            S.D.            N
    137.000         74.000          80.317      2382.308        8.301           80
NEW PAGE?
```




```
        MAX             MIN             MEAN            VAR.            S.D.            N
    110.000         79.000          30.299      1984.278        7.812           27
NEW PAGE?
```



Figuur 42

```
      3
27 41 33 33 39 109 110 104 99 92 94 99 38 109 113 132 137 123 115 107 109 119
      119 108 109 110 123 133 131 114 38 38 29
      80? 0
ENTER MAX. PLOTSIZE > AND < OR 0 TO BYPASS ** 0

ENTER NO. INPUT SERIES FOR TRANSFER MODEL ANALYSIS, 0 FOR STOCHASTIC ONLY ** 0

   ***BEGINNING OF STOCHASTIC PROCESS ANALYSIS***
ENTER SERIES,< VALUES OR VECTOR NAME> ** B

TYPE 0,1,2,3,4,5,8 OR ? FOR DESIRED TRANSFORMATION ** 0


     ***IDENTIFICATION SECTION***

INPUT MAX LAG FOR ACF                    ** 14
DIFF                    0          1          2          3

MEAN                38.4455     .0833   -1.2900     .2333
S.D.                 9.0459    2.3036    1.3011    1.2333
VAR.                81.3113  170.4465   82.4430   48.8333
D.F.                      33         32         31         30
APPROX.
SE(RHO)                .1714      .1771      .1800      .1833
        LAG
          1            .7171      .7633      .5886      .4600
          2            .3339      .3233     -.2195     -.4100
          3            .1103     -.0800     -.6244     -.7844
          4           -.0483     -.2033     -.3733     -.3083
          5           -.0867     -.1778      .1200      .3999
          6           -.0004     -.0922      .2793      .4339
          7            .0859     -.0433     -.0211      .0083
          8            .0933     -.0199     -.3200     -.4011
          9            .0388      .0433     -.2888     -.3233
         10            .0744      .1467      .1022      .1133
         11            .0844      .2900      .3711      .3911
         12           -.0100      .2700      .2744      .2100
         13           -.1388      .1711     -.0244     -.1467
         14           -.2833      .0044     -.1388     -.2933

INPUT ORDER OF DIFFERENCE FOR PLOT OR 999 IF NO PLOT ** 0
NEW PAGE?
```

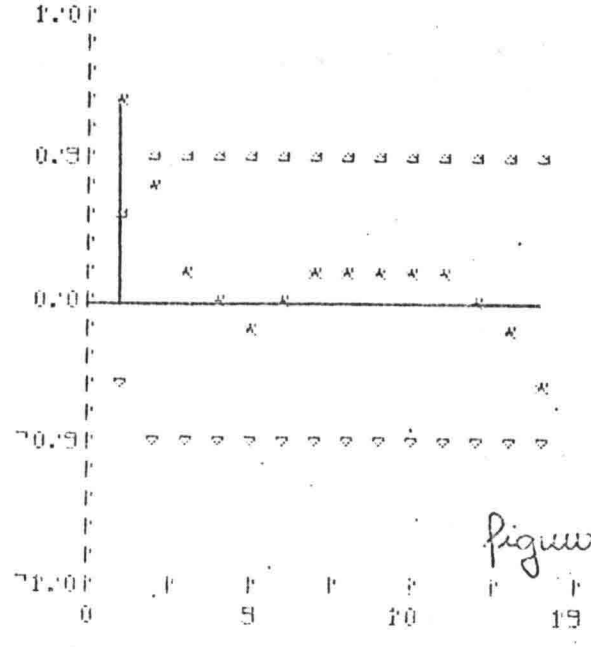


figure 43 I

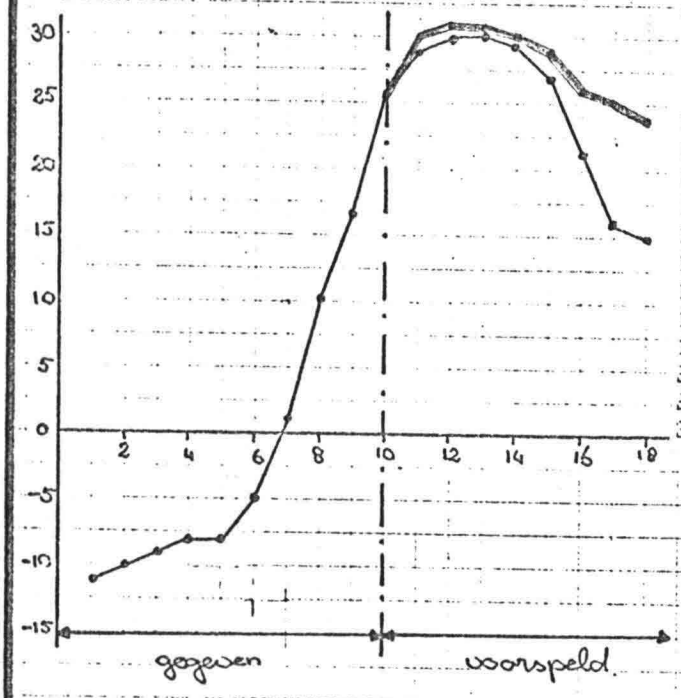
INPUT ORDER OF DIFFERENCE FOR PLOT OF 999 IF NO PLOT ** 1
NEW PAGE?

A

INPUT ORDER OF DIFFERENCE FOR PLOT OF 999 IF NO PLOT ** 2
NEW PAGE?

B

Figure 43 II



STOCHASTIC FORECASTING SECTION

OBS	80 PERCENT CONFIDENCE LIMI LOWER	FORECAST	
11	28.79	30.282	31.814
12	26.879	31.733	36.733
13	20	31.433	42.893
14	10.228	30.194	50.033
15	71.3193	28.487	58.253
16	713.803	28.721	67.091
17	729.919	29.124	76.184
18	737.77	23.73	85.33
19	748.913	22.719	94.33
20	759.228	21.929	103.09
21	768.701	21.377	111.45
22	777.381	21.018	119.41

18 rest waarden storm periode

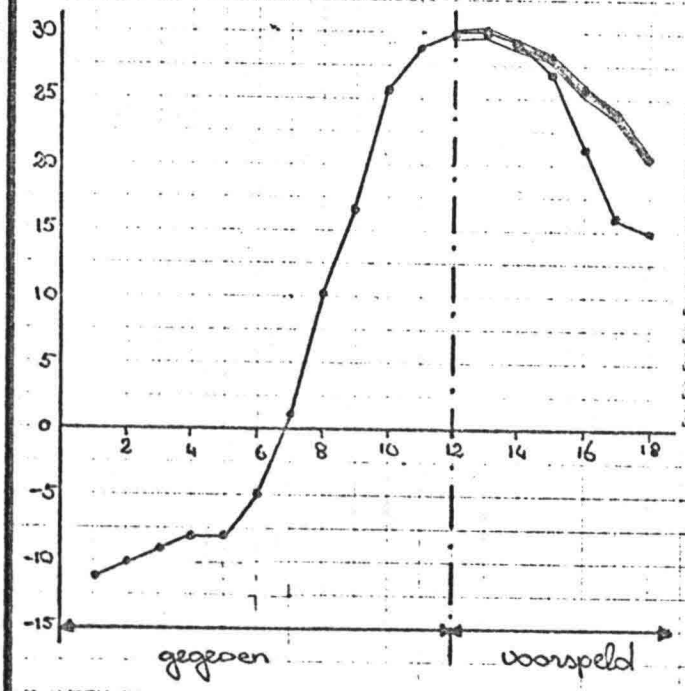
(2 1 2) AR: 1.46 -0.57

MA: -0.68 -0.98

res.var: 1.43

signific: 0.79

figuur 44



XXXSTOCHASTIC FORECASTING SECTIONXXX

OBS	80 PERCENT CONFIDENCE LIM LOWER		FORECAST
13	28.489	30.018	31.547
14	29.934	29.988	34.402
15	20.224	28.813	37.402
16	13.993	26.824	39.654
17	7.3849	24.298	41.147
18	0.8879	21.339	41.791
19	-79.1789	18.278	41.73
20	-10.842	15.232	41.107
21	-19.39	12.343	40.077
22	-19.38	9.7038	38.797
23	-22.82	7.3972	37.419
24	-29.198	5.4497	38.097

18 rest waarden storm periode

(2 0 2) AR: 1.76 -0.80

MA: -0.97 -0.83

res.var: 1.42

signific: 0.70

figuur 45

Soil	Regim	model	AR	MA	resVar	sign.	
S10	176.7 / .5	(2 0 0)	1.9 -1.		3.1	0.76	S1A
	13.4 / 4.1	(1 1 0)	1.		3.6	0.78	S1B
		(2 1 0)	1.7 -.9		2.2	0.95	S1C
	*	(2 1 2)	1.5 -.6	-.7 -1.	1.4	0.79	S1D
		(3 1 0)	1.7 -.9 .03		2.2	0.90	S1E
S12	272. / 5.3	(2 0 0)	1.9 -.9		3.2	0.34	S2A
	11.6 / 3.7	(1 1 0)	.9		4.5	0.44	S2B
		(2 1 0)	1.6 -.8		2.2	0.87	S2C
	*	(2 1 2)	1.4 -.6	-.3 -.8	1.5	0.93	S2D
		(3 1 0)	1.7 -1. .2		2.2	0.77	S2E
S18	262. / 11.2	(2 0 0)	1.9 -.9		3.7	0.92	S3A
	18.5 / 1.5	(1 1 0)	.9		4.9	0.89	S3B
		(2 1 0)	1.5 -.7		3.	0.98	S3C
	*	(2 1 2)	1.2 -.6	-.5 -.9	2.2	0.99	S3D
		(3 1 0)	1.5 -.9 .1		2.9	0.99	S3E

Figure 46

```
      PRT
33
      RT
27 41 53 33 59 109 110 104 99 92 94 88 93 109 115 132 137 129 119 107
   109 119 113 103 109 110 123 133 131 114 88 99 29
      DIRECT        ↙  ↖

INPUT RES,' DIFF,'   SERS,' PERIOD,' AND SERS,' DIFF  IN VECTOR FORM.'
ENTER ABOVE VECTOR       =>0
INTERRUPT
PROMPT[3]  ¢(0≠PRES¢(0,'INPUT',IPRE¢0)↑'/VARBL¢

      □WC'
      □PW←80
      DIRECT

INPUT RES,' DIFF,'   SERS,' PERIOD,' AND SERS,' DIFF  IN VECTOR FORM.'
ENTER ABOVE VECTOR       =>1 0 0
ENTER INPUT SERIES        ⍝⍝ RT
ENTER 0→7 FOR INFORMATION=>0
ENTER AR TERMS           =>1.03 ¯0.42
ENTER MA TERMS           =>¯0.238 ¯0.2887
ENTER EPS AND EPS2 OR 0 TO BYPASS=>0


ENTER 1 OR 0 FOR CONST  =>1
      MAX          MIN          MEAN         VAR.'        S.E.'        N
    20.000      ¯31.000         .063      170.448        2.308        32

   ⍝⍝⍝FINAL FITTING SECTION⍝⍝⍝

ENTER EPS AND EPS2 OR 0 TO BYPASS=>0
CONVERGENCE IS ASSUMED AT ITERATION NO: 8
NUMBER OF ITERATIONS PERFORMED       : 7
THE RESIDUAL VARIANCE IS             :  8.813 ←


FINAL AR ESTIMATES            1.293 ¯0.8843
FINAL MA ESTIMATES            ¯1.072 ¯0.8333
FINAL ESTIMATE FOR MEAN       1.0013
FINAL ESTIMATE FOR CONSTANT   0.4118


ENTER CONFIDENCE COEFFICIENT FOR ESTIMATES=>.9
                 COEFFICIENT                  S⍝IGMA(B)     CONFIDENCE INTERVAL
      TERM          B          SIGMA(B)          T          LOWER          UPPER
        1         1.293          .189         7.992         1.041         1.489
        2        ¯.884          .171        ¯3.879        ¯.884         ¯.449
        3        ¯1.072          .172        ¯8.231        ¯1.292        ¯.851
        4        ¯.834          .173        ¯3.899        ¯.398         ¯.411
        5         1.001         3.702          .270        ¯3.743         5.746
CORRELATION MATRIX
  1          ¯0.81221    0.47187    0.49797    0.07389
 ¯0.81221     1          ¯0.48113   ¯0.37288   ¯0.08489
  0.47197   ¯0.48113     1          0.71193    0.04903
  0.49797   ¯0.37288     0.71193    1          0.01911
  0.07389   ¯0.08489     0.04903    0.01911    1

   ⍝⍝⍝DIAGNOSTIC SECTION ON RESIDUALS⍝⍝⍝
THE CHI SQUARE STATISTIC = 14.059  WITH 20 DEGREES OF FREEDOM
THE LEVEL OF SIGNIFICANCE = 0.8279 ←
INPUT MAX LAG FOR ACF          =>8
```

(212)

Figuur 47 I

S (212) I

Stormodel (2 12)

DIFF	0
MEAN	7.131
S.D.	.920
VAR.	8.687
D.F.	32
APPROX.	
SE(MEAN)	.177

LAG	
1	.083
2	7.002
3	7.143
4	7.210
5	.274
6	.179
7	7.089
8	7.223

Stormmodel (2 12)

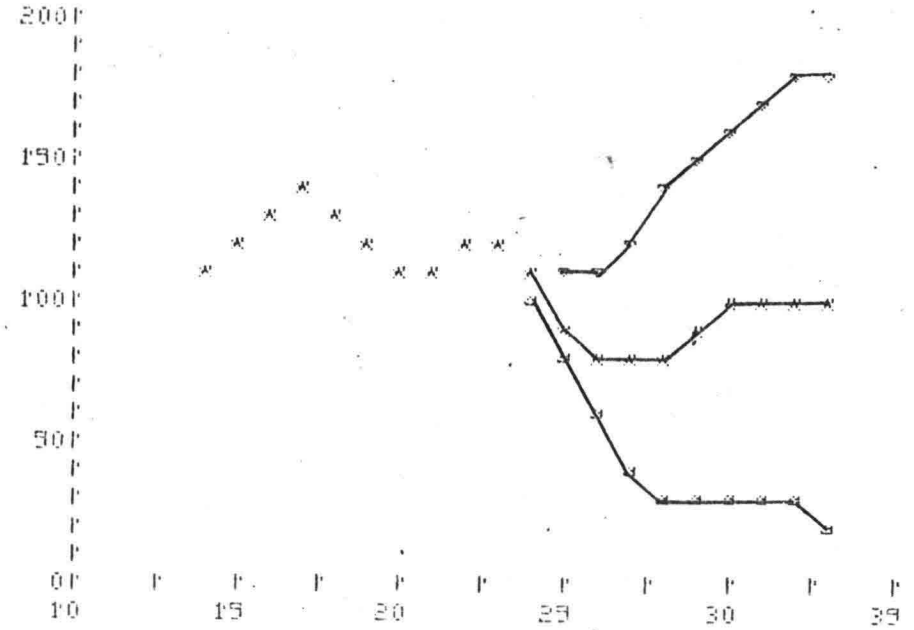
AUTOMATIC FORECASTING SECTION

ENTER VECTOR OF: LAGS ,ORIGIN,AND CONFIDENCE COEFFICIENT ** 10 23 .8

	80 PERCENT CONFIDENCE LIMITS		
OBS	LOWER	FORECAST	UPPER
24	102.408	108.213	110.018
25	80.197	93.409	106.620
* 26	58.348	83.812	110.278
27	33.730	80.291	121.772
28	29.291	82.988	136.934
29	28.441	88.992	151.943
30	26.899	89.188	183.840
31	29.787	99.310	171.833
32	29.093	100.811	178.923
33	21.800	100.332	179.104

OBS	original	forecast	± δ
24	108	106.21	3.8
25	105	93.41	13.21
26	110	83.61	27.07
27	123	80.25	41.52
28	133	82.96	
29	131	88.99	
30	114	95.17	
31	66	99.31	
32	55	100.81	
33	29	100.39	78.71

INPUT NO OF OBSERVATIONS PRECEDING FORECAST FOR PLOT
ENTER MAX, OUTSIDE 7 AND 8 OR 0 TO BYPASS ** 0
NEW PAGE?



figuur 47 II

	MAX	MIN	MEAN	VAR.	S.E.	N
BP	9.349	79.338	7.132	8.338	.304	33

ENTER DESIRED NO. RESIDUALS (N TAKES LAST N, N TAKES FIRST N, OR ALL) ** 33

	Observed	Computed	Residual	Standardized Res.
1	27.000	27.192	-.192	-.092
2	41.000	39.989	1.189	.402
3	53.000	48.649	4.351	1.988
4	89.000	84.749	4.239	1.486
5	89.000	88.922	.079	.027
6	109.000	108.829	.171	.981
7	110.000	110.489	-.489	-.187
8	104.000	104.902	-.902	-.173
9	99.000	96.728	2.272	.784
10	92.000	90.217	1.783	.809
11	94.000	97.999	-3.999	-1.386
12	98.000	99.783	-.217	-.079
13	98.000	99.314	-1.888	-.987
14	109.000	102.806	2.384	.828
15	118.000	117.122	.878	.303
16	132.000	132.910	-.910	-.178
17	137.000	141.331	-4.331	-1.499
18	129.000	129.414	-.414	-.143
19	119.000	112.879	2.121	.732
20	107.000	105.193	1.807	.924
21	109.000	108.989	.989	.333
22	119.000	117.340	-2.340	-.808
23	119.000	113.431	-3.431	-1.201
24	108.000	108.213	-1.787	-.917
25	109.000	99.391	9.849	1.990
26	110.000	113.489	-3.489	-1.204
27	123.000	118.908	4.492	1.990
28	133.000	138.388	-5.388	-2.088
29	131.000	133.738	-2.738	-.945
30	114.000	115.937	-1.937	-.931
31	88.000	91.058	-3.058	-1.749
32	99.000	98.223	.777	.422
33	29.000	30.349	-1.349	-.989

ENTER NO.' POINTS TO PLOT ORIGINAL VAR COMPUTED,AS ABOVE OR 0 AA 33
ENTER MAX.' PLOTTING # AND # OR 0 TO BYPASS AA 0
SPACE TO NEXT PAGE THEN PRESS RETURN

ESTIMATED = AAA

OBSERVED = OOO

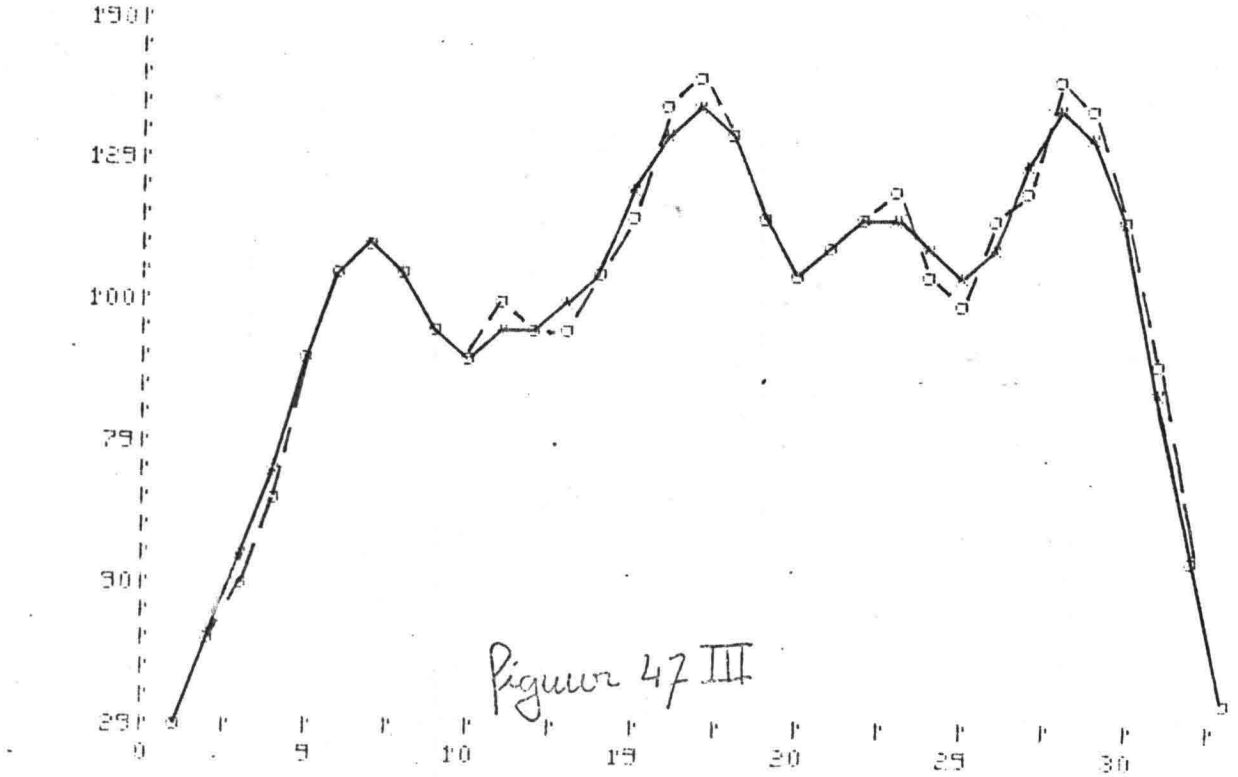
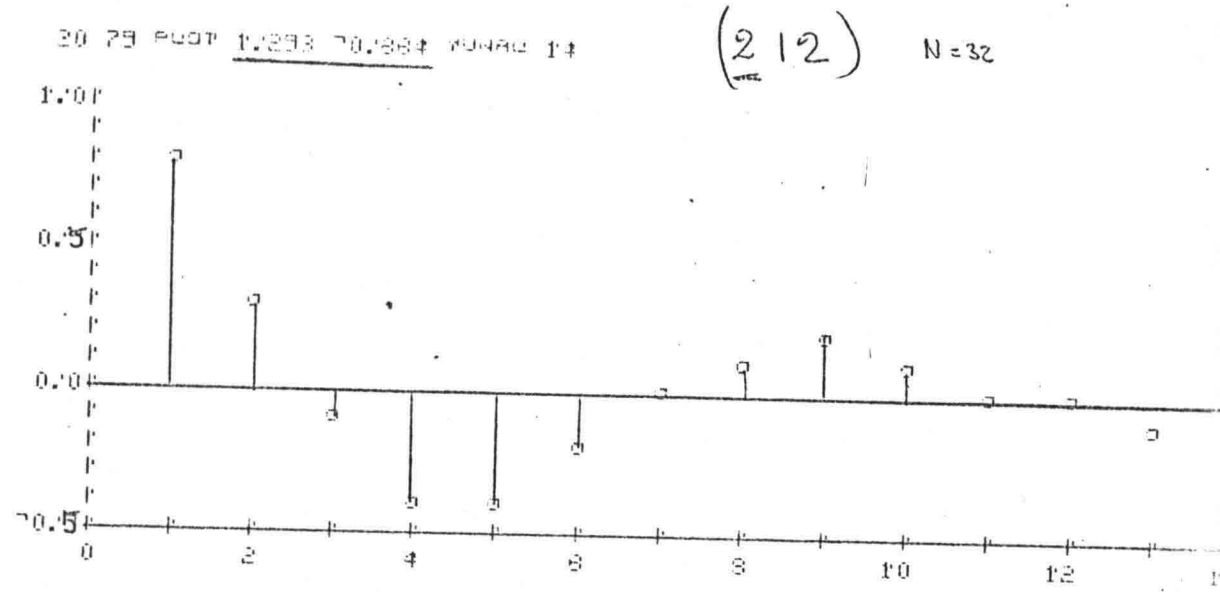
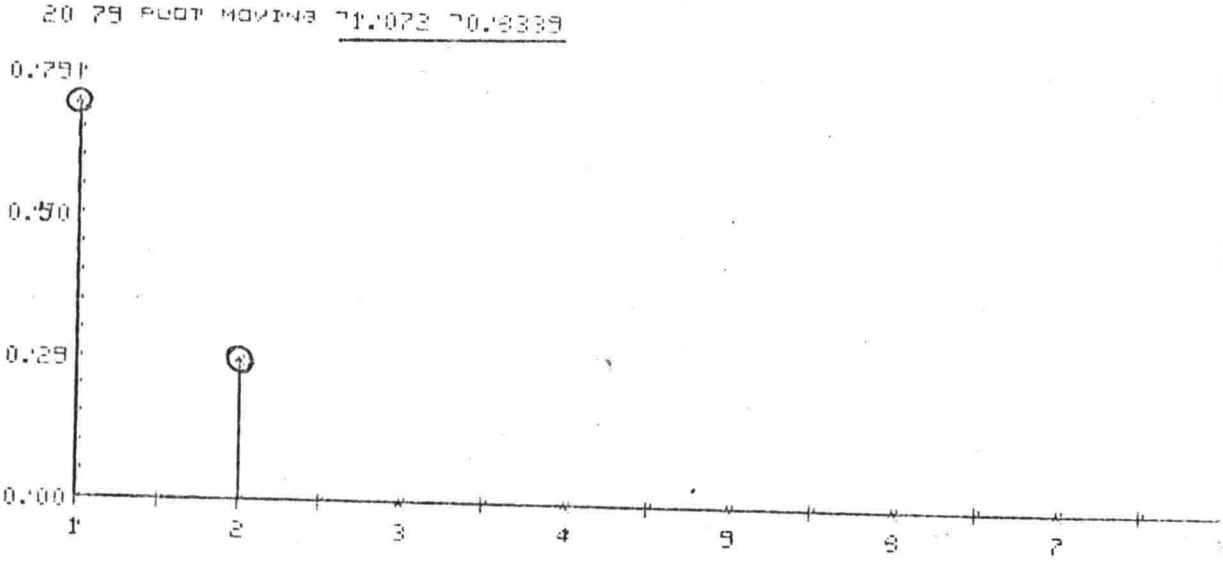


Figure 47 III



(2 12) N=32.



Figuur 47 IV

	z_t	$2.032z_{t-1}$	$-1.45z_{t-2}$	$0.42z_{t-3}$
	1	0	0	0
	2	2.03	0	0
	8	4.06	-1.45	0
	14	16.24	-2.9	0.42
	13	28.42	-11.6	0.84
	5	26.39	-20.3	3.36
	-1	10.15	-18.85	5.88
	3	-2.03	-7.25	5.46
	13	6.09	1.45	2.1
*	22	26.39	-4.35	-0.42
	28	44.66	-18.85	1.26
	36	56.84	-31.9	5.46
	51	73.08	-40.6	9.24
	67	103.53	-52.2	11.76
	77	136.01	-73.95	15.12
	77	156.31	-97.15	21.42
	77	156.31	-111.65	28.14
	88	156.31	-111.65	32.34
	109	178.64	-111.65	32.34
	124	221.27	-127.6	32.34
	123	251.72	-158.05	36.96
	108	249.69	-179.8	45.78
	91	219.24	-178.35	52.08
	80	184.73	-156.6	51.66
	74	162.4	-131.95	45.36
	64	150.22	-116	38.22
	46	129.92	-107.3	33.6
		②	③	④

	z_t	⑤+②+④
	1	0
	2	2.03
	8	2.61
	14	13.76
	13	17.66
	5	9.45
	-1	-2.82
	3	-3.82
	13	9.64
*10	22	21.62
11	28	27.07
12	36	30.4
13	51	41.72
14	67	63.09
15	77	77.18
16	77	80.58
17	77	72.8
18	88	77
19	109	99.33
20	124	126.01
21	123	130.63
22	108	115.67
23	91	92.97
	80	79.79
	74	75.81
	64	72.44
	46	56.22

Figuur 48

t=10 $z(10) = \psi_1 z(9) + \psi_2 z(8) + \psi_3 z(7) - \theta_1 a(9) - \theta_2 a(8)$ <22>
$21.62 + 0.30 * 0.56 + 0.27 * 5.69 = 23.32$

$z(11) = \psi_1 z(10) + \psi_2 z(9) + \psi_3 z(8) - \theta_2 a_9 =$ <28>
$24.38 + 0.27 * 0.56 = 24.53$

$z(12) = \psi_1 z(11) + \psi_2 z(10) + \psi_3 z(9) =$ <36>
21.44

$a(10) = 22 - 23.32 = -1.32$

t=11 $z(11) = 27.07 + 0.30 * -1.32 + 0.27 * 0.56 = 26.82$ <28>

$z(12) = 28.0 + 0.27 * -1.32 = 27.65$ <36>

$z(13) =$ <51>
26.48

$a(11) = 28 - 26.82 = 1.17$

t=12 $z(12) = 30.04 + 0.30 * 1.17 + 0.27 * -1.32 = 30.03$ <36>

$z(13) = 30.26 + 0.27 * 1.17 = 30.56$ <51>

$z(14) =$ <67>
31.10

$a(12) = 36 - 30.03 = 5.97$

t=13 $z(13) = 41.72 + 0.30 * 5.97 + 0.27 * 1.17 = 43.83$ <51>

$z(14) = 48.53 + 0.27 * 5.97 = 50.15$ <67>

$z(15) =$ <77>
53.36

$a(13) = 51 - 43.83 = 7.17$

t=14 $z(14) = 63.09 + 0.30 * 7.17 + 0.27 * 5.97 = 66.85$ <67>

$z(15) = 76.88 + 0.27 * 7.17 = 78.81$ <77>

$z(16) =$ <77>
84.47

$a(14) = 67 - 66.85 = 0.15$

t=15 $z(15) = 77.18 + 0.30 * 0.15 + 0.27 * 7.17 = 79.16$ <77>

$z(16) = 84.97 + 0.27 * 0.15 = 85.0$ <77>

$z(17) =$ <77>
85.92

$a(15) = 77 - 79.16 = -2.16$

t=16 $z(16) = 80.58 + 0.30 * -2.16 + 0.27 * .15 = 79.97$ <77>

$z(17) = 78.83 + 0.27 * -2.16 = 78.25$ <77>

$z(18) =$ <88>
75.22

$a(16) = 77 - 79.97 = -2.97$

t=17 $z(17) = 72.8 + 0.30 * -2.97 + 0.27 * -2.16 = 71.33$ <77>

$z(18) = 67.1 + 0.27 * -2.97 = 65.49$ <88>

$z(19) =$ <109>
61.86

$a(17) = 77 - 71.33 = 5.67$

t=18 $z(18) = 77 + 0.30 * 5.67 + 0.27 * -2.97 = 77.90$ <88>

$z(19) = 78.83 + 0.27 * 5.67 = 80.36$ <109>

$z(20) =$ <124>
82.51

$a(18) = 88 - 77.9 = 10.1$

t=19 $z(19) = 99.33 + 0.30 * 10.1 + 0.27 * 5.67 = 103.89$ <109>

$z(20) = 115.64 + 0.27 * 10.1 = 118.36$ <124>

$z(21) =$ <123>
126.59

$a(19) = 109 - 103.89 = 5.11$

t=20 $z(20) = 126.01 + 0.30 * 5.11 + 0.27 * 10.1 = 130.85$ <124>

$z(21) = 144.54 + 0.27 * 5.11 = 145.9$ <123>

$z(22) =$ <108>
152.25

$a(20) = 124 - 130.85 = -6.85$

t=21 $z(21) = 130.63 + 0.30 * -6.85 + 0.27 * 5.11 = 129.95$ <123>

$z(22) = 129.77 + 0.27 * -6.85 = 127.93$ <108>

$z(23) =$ <91>
123.35

$a(21) = 123 - 129.95 = -6.95$

t=22 $z(22) = 115.67 + 0.30 * -6.95 + 0.27 * -6.85 = 111.74$ <108>

$z(23) = 100.56 + 0.27 * -6.95 = 98.68$ <91>

t=23 $z(23) = 89.97$

figuur 49