SMM C/P 1980 DOY121   80 +/- 0 degrees

height = h + velocity*time   # data points =   4

Top of Front cloud

S=SMM   M=MK3   P=PMON

SMM & MK3 - CORRECTED TIMES

height [solar radii]

6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00

11:50   11:55   12:00   12: 5   12:10   12:15   12:20
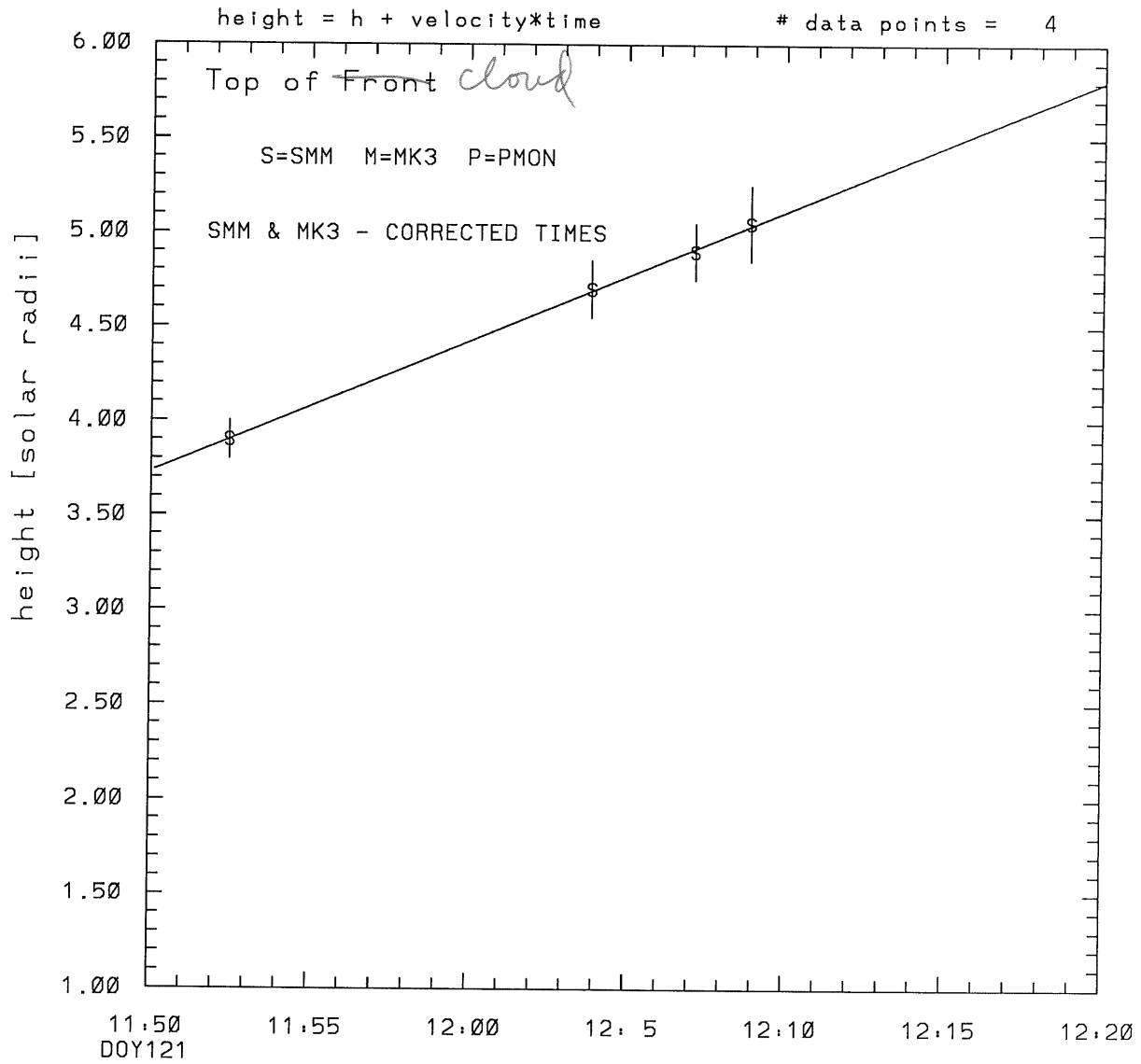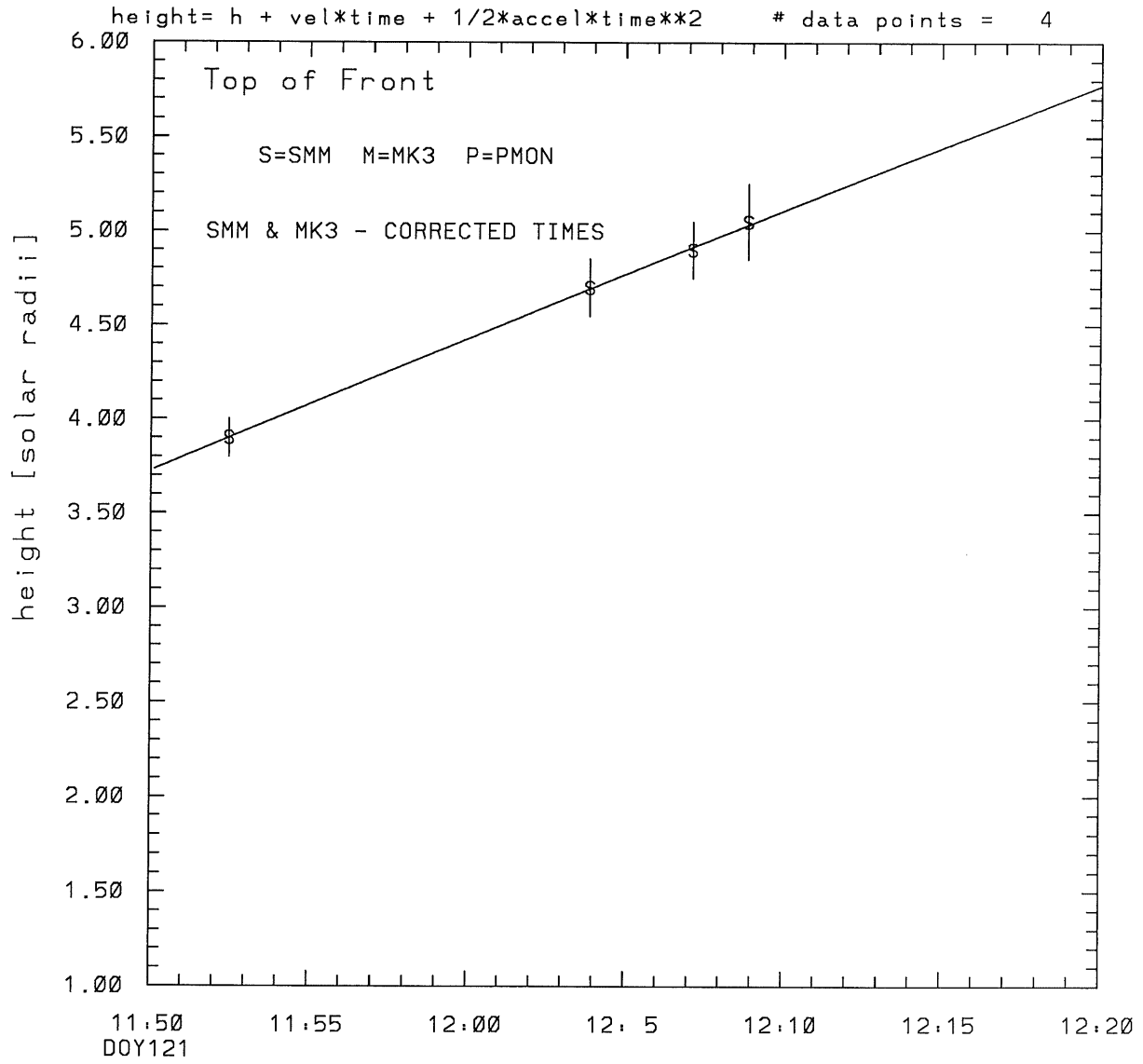DOY121

tstart=DOY121 11:11 +/-   0.2 [min.]
radial velocity= 803. +/-   9. [km/sec]

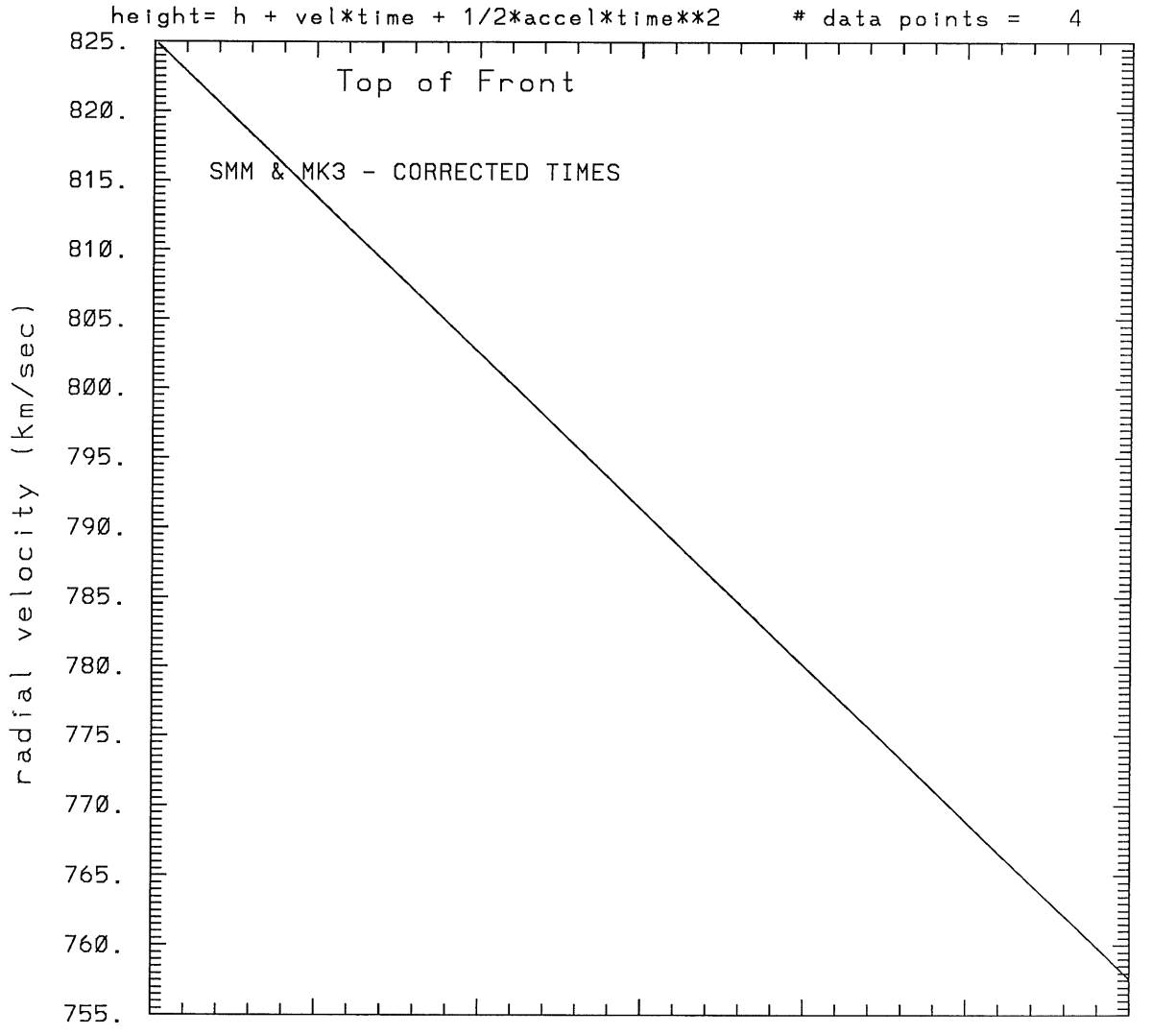SMM C/P 1980 DOY121   80 +/-   0 degrees

height= h + vel*time + 1/2*accel*time**2   # data points =   4

Top of Front

S=SMM M=MK3 P=PMON

SMM & MK3 - CORRECTED TIMES

height [solar radii]

tstart=DOY121 11:14 +/-   81.5 [min.]

radial acceleration=-0.0375 +/- 0.1362 [km/sec**2]

SMM C/P 1980 DOY121   80 +/-   0 degrees

height= h + vel*time + 1/2*accel*time**2   # data points =   4

Top of Front

SMM & MK3 - CORRECTED TIMES

radial velocity (km/sec)

825.
820.
815.
810.
805.
800.
795.
790.
785.
780.
775.
770.
765.
760.
755.

11:50   11:55   12:00   12: 5   12:10   12:15   12:20
DOY121

tstart=DOY121 11:14 +/-   81.5 [min.]

radial acceleration=-.375E-01 km/sec**2

```
********************
 This is a 1 order run
********************


*******
 INPUT:
*******


                          error in        error in
 year doy    time    radii  radius    angle  angle   datatype
 1980 121  11:52:28  3.90 +/- 0.10    80.0 +/-  1.0     SMM
 1980 121  12: 3:52  4.70 +/- 0.15    80.0 +/-  1.0     SMM
 1980 121  12: 7: 8  4.90 +/- 0.15    80.0 +/-  1.0     SMM
 1980 121  12: 8:53  5.05 +/- 0.20    80.0 +/-  1.0     SMM


 ****************************************
  Structure being measured:
 Top of Front
 ****************************************


 ********
  OUTPUT:
 ********


 START TIME:


 Event began at t = 0 + -0.394E+02 +/-  0.210E+00 [minutes]
 In more convenient units:
 Event began at DOY 121 11:11 +/-  0.210E+00 [minutes]


  Origin defined at DOY121 11:50


 RADIAL INFORMATION:


 RADIAL VELOCITY =   803. +/-    9. km/sec
```

The computed RADIAL coefficients and errors FROM NLLST2 are:

```
 c(1) =    0.373E+01 +/-   0.961E-02 [solar radii]
 c(2) =    0.692E-01 +/-   0.797E-03 [radii/min]
 c(2) =    0.803E+03 +/-   0.924E+01 [km/sec]
 c(3) =    0.000E+00 +/-   0.000E+00 [radii/min**2]
 c(3) =    0.000E+00 +/-   0.000E+00 [km/sec**2]
```

The computed ERRORS in coefficients [BEVINGTON] are:

```
           error in c(1)= 0.18455E-01 [radii] see Bevington pg. 114
           error in c(2)= 0.12671E-02 [radii/min] see Bevington pg. 114
```
ANGULAR INFORMATION:

ANGULAR VELOCITY = 0.0000E+00 +/-   0.0000E+00[radians/sec]

The computed ANGULAR coefficients and errors FROM NLLST2 are:

a(1) = 80. +/-   0. [degrees]
a(2) =   0.000E+00 +/-   0.000E+00 [degrees/min]
a(2) =   0.000E+00 +/-   0.000E+00 [rad/sec]
a(3) =   0.000E+00 +/-   0.000E+00 [degrees/min**2]
a(3) =   0.000E+00 +/-   0.000E+00 [rad/sec**2]

THE TANGENTIAL AND TOTAL VELOCITIES AT EACH DATA POINT ARE:
The TANGENTIAL velocity at 11:52 = 0.000E+00 km/sec
The TOTAL velocity at 11:52 = 803. km/sec

The TANGENTIAL velocity at 12: 3 = 0.000E+00 km/sec
The TOTAL velocity at 12: 3 = 803. km/sec

The TANGENTIAL velocity at 12: 7 = 0.000E+00 km/sec
The TOTAL velocity at 12: 7 = 803. km/sec

The TANGENTIAL velocity at 12: 8 = 0.000E+00 km/sec
The TOTAL velocity at 12: 8 = 803. km/sec

****
 The following info is for estimating goodness of the fit
****

Fit is ok [ier=1]

Standard Deviation in the height = 0.51
Standard Deviation in start time measurement =   0.639E+01
Error in time =   0.33084E+00 using best fit method
See Taylor Error Analysis [Univ of Colorado] pg.78

Value of reduced Chi Squared returned from nllst2 = 0.125E-03
Reduced Chi Squared = 0.818E-03
Chi Squared = 0.164E-02
The probability for exceeding chi square = 0.100E+01

The correlation coefficient =   0.100E+01
The probability that no LINEAR correlation exists between the variables =   0.3248E-03
SEE BEVINGTON "Data Reduction and Error Analysis" [1969]

```
********************
 This is a 2 order run
********************


*******
 INPUT:
*******


                          error in       error in
year doy    time    radii  radius    angle  angle   datatype
1980 121  11:52:28  3.90 +/- 0.10   80.0 +/- 1.0    SMM
1980 121  12: 3:52  4.70 +/- 0.15   80.0 +/- 1.0    SMM
1980 121  12: 7: 8  4.90 +/- 0.15   80.0 +/- 1.0    SMM
1980 121  12: 8:53  5.05 +/- 0.20   80.0 +/- 1.0    SMM


****************************************
 Structure being measured:
Top of Front
****************************************


********
 OUTPUT:
********
```

START TIME:

Event began at t = 0 + -0.365E+02 +/- 0.815E+02 [minutes]
In more convenient units:
Event began at DOY 121 11:14 +/- 0.815E+02 [minutes]

Origin defined at DOY121 11:50

RADIAL INFORMATION:

RADIAL ACCELERATION = -0.375E-01 +/- 0.136E+00 km/sec**2

The computed RADIAL coefficients and errors FROM NLLST2 are:

```
c(1) =    0.373E+01 +/-   0.200E-01 [solar radii]
c(2) =    0.711E-01 +/-   0.696E-02 [radii/min]
c(2) =    0.825E+03 +/-   0.808E+02 [km/sec]
c(3) =   -0.970E-04 +/-   0.352E-03 [radii/min**2]
c(3) =   -0.375E-01 +/-   0.136E+00 [km/sec**2]
```

The computed ERRORS in coefficients [BEVINGTON] are:

```
        Approximate error in c(1) = 0.39047E-01 [radii] Bevington pg 154 (8-30)
            Exact error in c(1) = 0.84329E-02 [radii] Bevington pg 154 (8-28)
        Approximate error in c(2) = 0.10668E-01 [radii/min] Bevington pg 154 (8-30)
            Exact error in c(2) = 0.39465E-02 [radii/min] Bevington pg 154 (8-28)
        Approximate error in c(3) = 0.51412E-03 [radii/min**] Bevington pg 154 (8-30)
            Exact error in c(3) = 0.21649E-03 [radii/min**] Bevington pg 154 (8-28)
```

ANGULAR INFORMATION:

ANGULAR ACCELERATION= 0.0000E+00 +/- 0.0000E+00[radians/sec**2]

The computed ANGULAR coefficients and errors FROM NLLST2 are:

a(1) = 80. +/- 0. [degrees]
a(2) = 0.000E+00 +/- 0.000E+00 [degrees/min]
a(2) = 0.000E+00 +/- 0.000E+00 [rad/sec]
a(3) = 0.000E+00 +/- 0.000E+00 [degrees/min**2]
a(3) = 0.000E+00 +/- 0.000E+00 [rad/sec**2]

THE TANGENTIAL AND TOTAL VELOCITIES AT EACH DATA POINT ARE:
The TANGENTIAL velocity at 11:52 = 0.000E+00 km/sec
The TOTAL velocity at 11:52 = 820. km/sec

The TANGENTIAL velocity at 12: 3 = 0.000E+00 km/sec
The TOTAL velocity at 12: 3 = 794. km/sec

The TANGENTIAL velocity at 12: 7 = 0.000E+00 km/sec
The TOTAL velocity at 12: 7 = 787. km/sec

The TANGENTIAL velocity at 12: 8 = 0.000E+00 km/sec
The TOTAL velocity at 12: 8 = 783. km/sec

****
 The following info is for estimating goodness of the fit
****

Fit is ok [ier=1]

Standard Deviation in the height = 0.51
Standard Deviation in start time measurement = 0.639E+01
Value of reduced Chi Squared returned from nllst2 = 0.181E-03
Reduced Chi Squared = 0.186E-02
Chi Squared = 0.186E-02
The probability for exceeding chi square = 0.989E+00

For a second order fit 3 correlation coefficients are given:
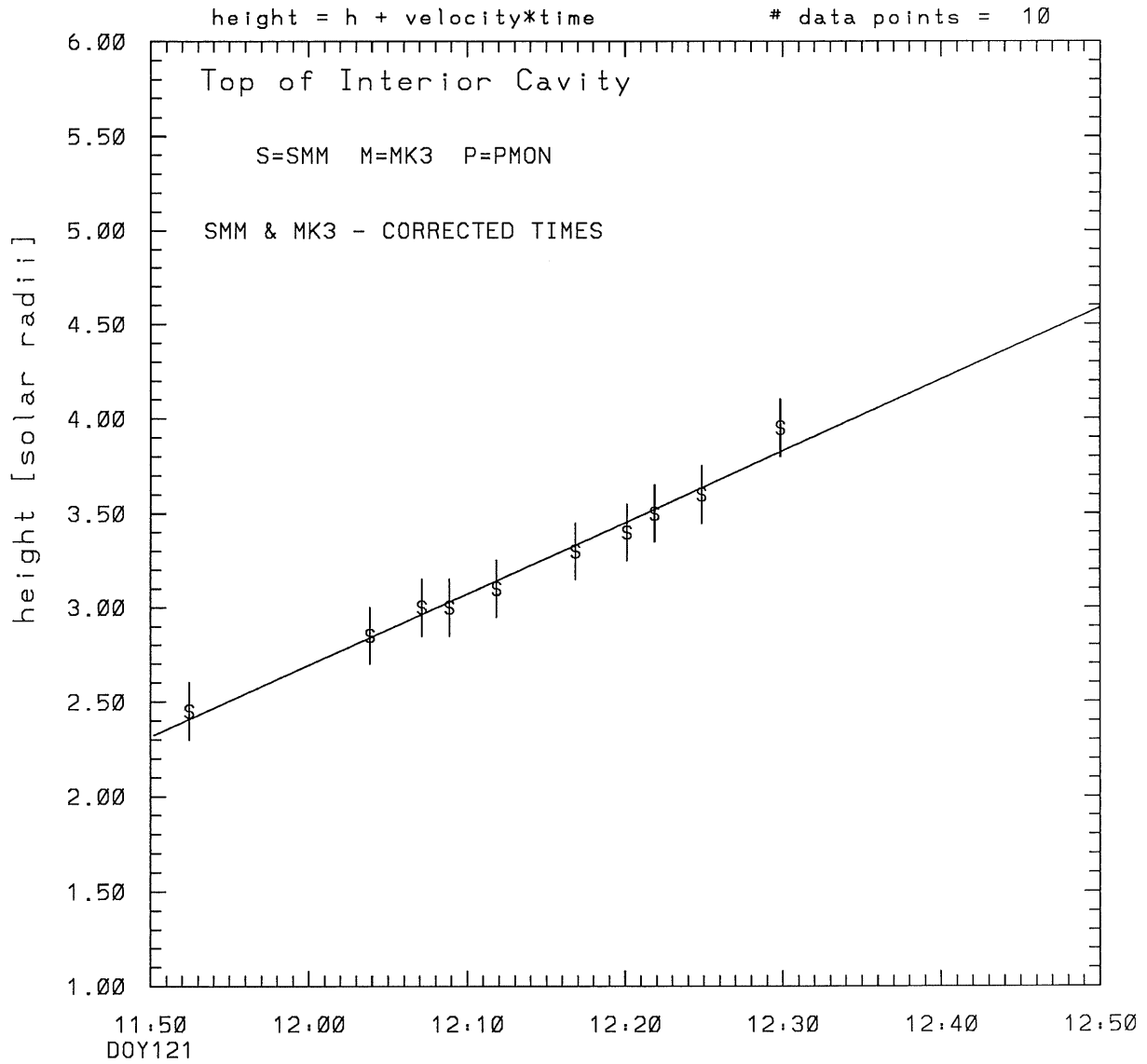 (Using equation of motion: r = a + bt + at**2)
The correlation between the data and the term linear in time = 0.1214E+01
The correlation between the data and the time**2 term = 0.1152E+01
The correlation between the data and the complete equation of motion = 0.9982E+00
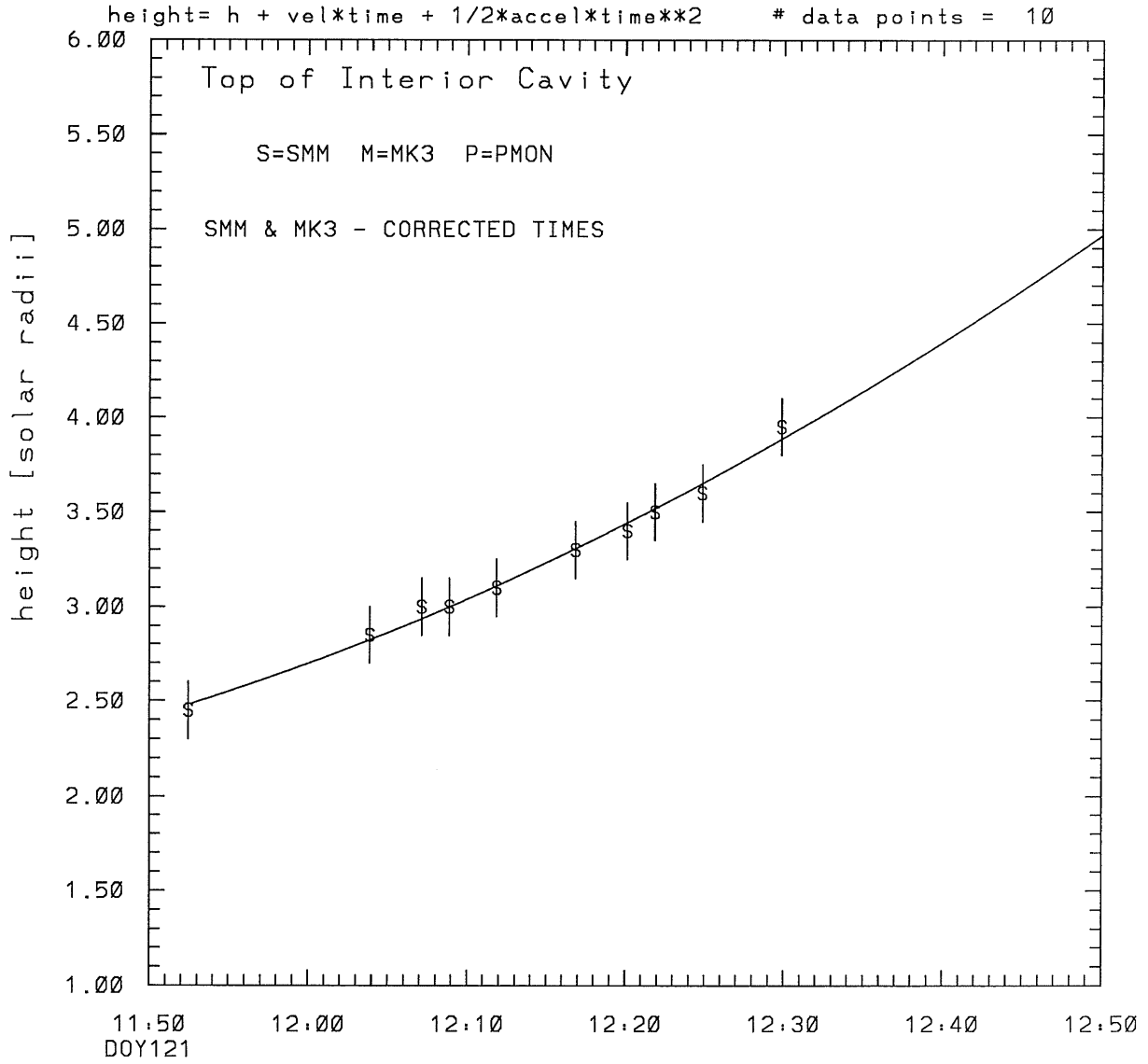SEE BEVINGTON "Data Reduction and Error Analysis" [1969]

SMM C/P 1980 DOY121   72 +/- Ø degrees

height = h + velocity*time   # data points = 10

Top of Interior Cavity

S=SMM   M=MK3   P=PMON

SMM & MK3 - CORRECTED TIMES

height [solar radii]

tstart=DOY121 11:17 +/-   Ø.3 [min.]
radial velocity= 439. +/- 19. [km/sec]

SMM C/P 1980 DOY121   72 +/-   0 degrees

height= h + vel*time + 1/2*accel*time**2   # data points = 10

Top of Interior Cavity

S=SMM M=MK3 P=PMON
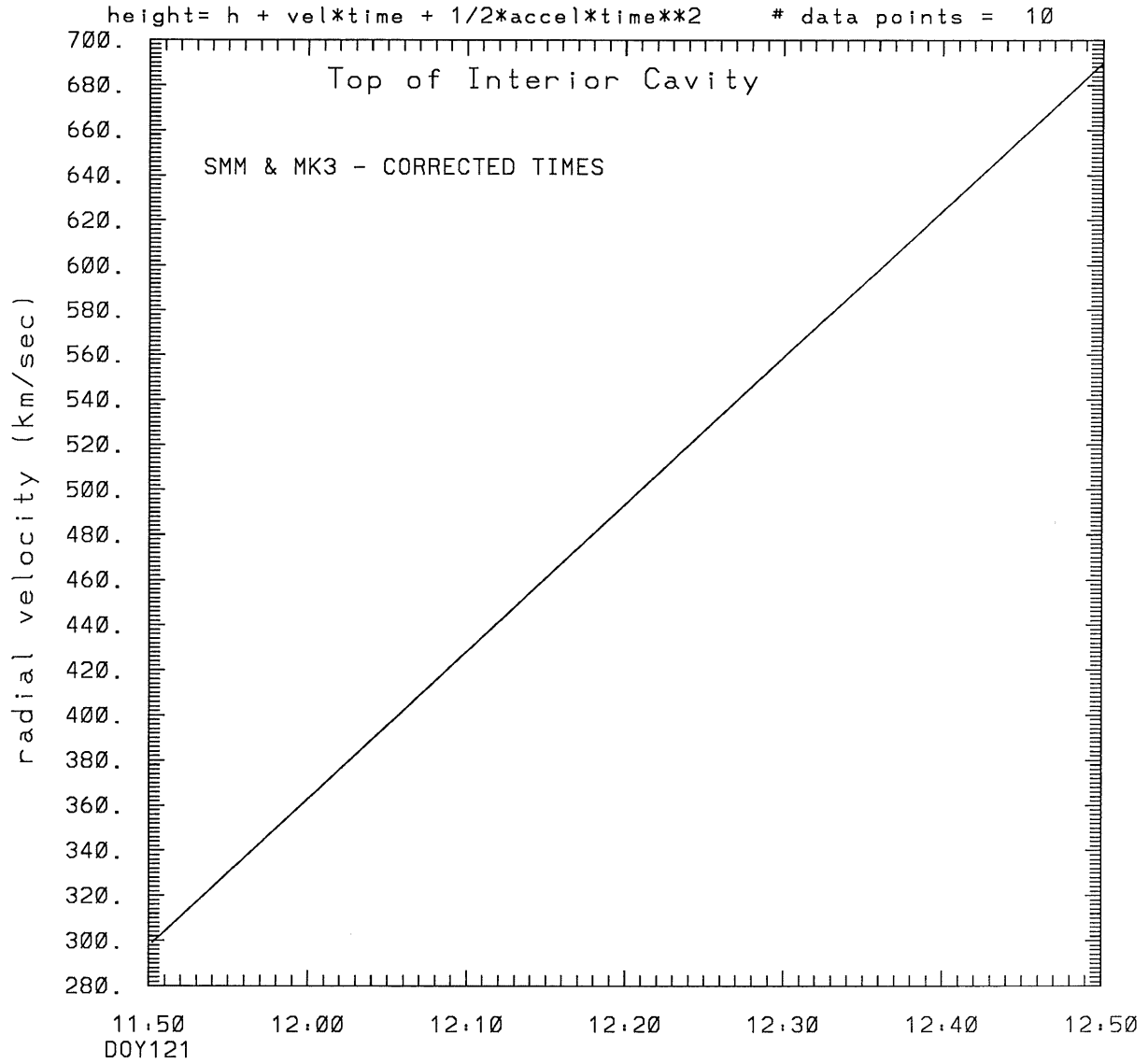
SMM & MK3 - CORRECTED TIMES

height [solar radii]

tstart=DOY121 11: 5   from derivative=0
Event begins at   1.83 Solar Radii
radial acceleration= 0.1089 +/- 0.0414 [km/sec**2]

SMM C/P 1980 DOY121   72 +/- 0 degrees

height= h + vel*time + 1/2*accel*time**2   # data points = 10

Top of Interior Cavity

SMM & MK3 - CORRECTED TIMES

radial velocity (km/sec)

700.
680.
660.
640.
620.
600.
580.
560.
540.
520.
500.
480.
460.
440.
420.
400.
380.
360.
340.
320.
300.
280.

11:50   12:00   12:10   12:20   12:30   12:40   12:50
DOY121

tstart=DOY121 11: 5   from derivative=0
Event begins at   1.83 Solar Radii
radial acceleration=0.109E+00 km/sec**2

```
********************
  This is a 1 order run
********************


*******
  INPUT:
*******


                          error in          error in
year doy    time    radii  radius    angle  angle    datatype
1980 121  11:52:28  2.45 +/- 0.15    72.0 +/-  0.5      SMM
1980 121  12: 3:52  2.85 +/- 0.15    72.0 +/-  0.5      SMM
1980 121  12: 7: 8  3.00 +/- 0.15    72.0 +/-  1.0      SMM
1980 121  12: 8:53  3.00 +/- 0.15    72.0 +/-  1.0      SMM
1980 121  12:11:52  3.10 +/- 0.15    72.0 +/-  1.0      SMM
1980 121  12:16:52  3.30 +/- 0.15    72.0 +/-  1.0      SMM
1980 121  12:20: 8  3.40 +/- 0.15    72.0 +/-  1.0      SMM
1980 121  12:21:53  3.50 +/- 0.15    72.0 +/-  1.0      SMM
1980 121  12:24:52  3.60 +/- 0.15    72.0 +/-  1.0      SMM
1980 121  12:29:52  3.95 +/- 0.15    72.0 +/-  1.0      SMM


******************************************
  Structure being measured:
Top of Interior Cavity
******************************************


*******
  OUTPUT:
*******


START TIME:
```

START TIME:

Event began at t = 0 + -0.347E+02 +/- 0.327E+00 [minutes]
In more convenient units:
Event began at DOY 121 11:17 +/- 0.327E+00 [minutes]

Origin defined at DOY121 11:50

RADIAL INFORMATION:

RADIAL VELOCITY = 439. +/-   19. km/sec

The computed RADIAL coefficients and errors FROM NLLST2 are:

c(1) =   0.231E+01 +/-   0.430E-01 [solar radii]
c(2) =   0.379E-01 +/-   0.165E-02 [radii/min]
c(2) =   0.439E+03 +/-   0.192E+02 [km/sec]
c(3) =   0.000E+00 +/-   0.000E+00 [radii/min**2]
c(3) =   0.000E+00 +/-   0.000E+00 [km/sec**2]

The computed ERRORS in coefficients [BEVINGTON] are:

error in c(1)= 0.45613E-01 [radii] see Bevington pg. 114

error in c(2)= 0.17520E-02 [radii/min] see Bevington pg. 114
ANGULAR INFORMATION:

ANGULAR VELOCITY = 0.0000E+00 +/- 0.0000E+00[radians/sec]

The computed ANGULAR coefficients and errors FROM NLLST2 are:

a(1) = 72. +/-   0. [degrees]
a(2) =   0.000E+00 +/-   0.000E+00 [degrees/min]
a(2) =   0.000E+00 +/-   0.000E+00 [rad/sec]
a(3) =   0.000E+00 +/-   0.000E+00 [degrees/min**2]
a(3) =   0.000E+00 +/-   0.000E+00 [rad/sec**2]

THE TANGENTIAL AND TOTAL VELOCITIES AT EACH DATA POINT ARE:
The TANGENTIAL velocity at 11:52 = 0.000E+00 km/sec
The TOTAL velocity at 11:52 = 439. km/sec

The TANGENTIAL velocity at 12: 3 = 0.000E+00 km/sec
The TOTAL velocity at 12: 3 = 439. km/sec

The TANGENTIAL velocity at 12: 7 = 0.000E+00 km/sec
The TOTAL velocity at 12: 7 = 439. km/sec

The TANGENTIAL velocity at 12: 8 = 0.000E+00 km/sec
The TOTAL velocity at 12: 8 = 439. km/sec

The TANGENTIAL velocity at 12:11 = 0.000E+00 km/sec
The TOTAL velocity at 12:11 = 439. km/sec

The TANGENTIAL velocity at 12:16 = 0.000E+00 km/sec
The TOTAL velocity at 12:16 = 439. km/sec

The TANGENTIAL velocity at 12:20 = 0.000E+00 km/sec
The TOTAL velocity at 12:20 = 439. km/sec

The TANGENTIAL velocity at 12:21 = 0.000E+00 km/sec
The TOTAL velocity at 12:21 = 439. km/sec

The TANGENTIAL velocity at 12:24 = 0.000E+00 km/sec
The TOTAL velocity at 12:24 = 439. km/sec

The TANGENTIAL velocity at 12:29 = 0.000E+00 km/sec
The TOTAL velocity at 12:29 = 439. km/sec

****
 The following info is for estimating goodness of the fit
****

Fit is ok [ier=1]

Standard Deviation in the height = 0.43

Standard Deviation in start time measurement =   0.106E+02
Error in time =   0.43834E+01 using best fit method
See Taylor Error Analysis [Univ of Colorado] pg.78

Value of reduced Chi Squared returned from nllst2 = 0.306E-02
Reduced Chi Squared = 0.274E-01
Chi Squared = 0.220E+00
The probability for exceeding chi square = 0.100E+01

The correlation coefficient =   0.992E+00
The probability that no LINEAR correlation exists between the variables =   0.2204E-07
SEE BEVINGTON "Data Reduction and Error Analysis" [1969]

```
********************
 This is a 2 order run
********************


*******
 INPUT:
*******


                      error in        error in
year doy    time   radii  radius   angle  angle    datatype
1980 121  11:52:28  2.45 +/- 0.15    72.0 +/-  0.5     SMM
1980 121  12: 3:52  2.85 +/- 0.15    72.0 +/-  0.5     SMM
1980 121  12: 7: 8  3.00 +/- 0.15    72.0 +/-  1.0     SMM
1980 121  12: 8:53  3.00 +/- 0.15    72.0 +/-  1.0     SMM
1980 121  12:11:52  3.10 +/- 0.15    72.0 +/-  1.0     SMM
1980 121  12:16:52  3.30 +/- 0.15    72.0 +/-  1.0     SMM
1980 121  12:20: 8  3.40 +/- 0.15    72.0 +/-  1.0     SMM
1980 121  12:21:53  3.50 +/- 0.15    72.0 +/-  1.0     SMM
1980 121  12:24:52  3.60 +/- 0.15    72.0 +/-  1.0     SMM
1980 121  12:29:52  3.95 +/- 0.15    72.0 +/-  1.0     SMM
```

```
******************************************
 Structure being measured:
Top of Interior Cavity
******************************************
```

```
********
 OUTPUT:
********
```

START TIME:

tstart=DOY121 11: 5 from derivative = 0
Event begins at   1.83 Solar Radii
 Origin defined at DOY121 11:50

RADIAL INFORMATION:

RADIAL ACCELERATION = 0.109E+00 +/- 0.414E-01 km/sec**2

The computed RADIAL coefficients and errors FROM NLLST2 are:

c(1) =   0.241E+01 +/-   0.505E-01 [solar radii]
c(2) =   0.257E-01 +/-   0.482E-02 [radii/min]
c(2) =   0.298E+03 +/-   0.559E+02 [km/sec]
c(3) =   0.282E-03 +/-   0.107E-03 [radii/min**2]
c(3) =   0.109E+00 +/-   0.414E-01 [km/sec**2]

The computed ERRORS in coefficients [BEVINGTON] are:

        Approximate error in c(1) = 0.53960E-01 [radii] Bevington pg 154 (8-30)
            Exact error in c(1) = 0.12681E-01 [radii] Bevington pg 154 (8-28)
        Approximate error in c(2) = 0.51519E-02 [radii/min] Bevington pg 154 (8-30)

Exact error in c(2) = 0.11249E-02 [radii/min] Bevington pg 154 (8-28)
Approximate error in c(3) = 0.11458E-03 [radii/min**] Bevington pg 154 (8-30)
Exact error in c(3) = 0.24912E-04 [radii/min**] Bevington pg 154 (8-28)

ANGULAR INFORMATION:

ANGULAR ACCELERATION= 0.0000E+00 +/- 0.0000E+00[radians/sec**2]

The computed ANGULAR coefficients and errors FROM NLLST2 are:

a(1) = 72. +/- 0. [degrees]
a(2) = 0.000E+00 +/- 0.000E+00 [degrees/min]
a(2) = 0.000E+00 +/- 0.000E+00 [rad/sec]
a(3) = 0.000E+00 +/- 0.000E+00 [degrees/min**2]
a(3) = 0.000E+00 +/- 0.000E+00 [rad/sec**2]

THE TANGENTIAL AND TOTAL VELOCITIES AT EACH DATA POINT ARE:
The TANGENTIAL velocity at 11:52 = 0.000E+00 km/sec
The TOTAL velocity at 11:52 = 314. km/sec

The TANGENTIAL velocity at 12: 3 = 0.000E+00 km/sec
The TOTAL velocity at 12: 3 = 388. km/sec

The TANGENTIAL velocity at 12: 7 = 0.000E+00 km/sec
The TOTAL velocity at 12: 7 = 410. km/sec

The TANGENTIAL velocity at 12: 8 = 0.000E+00 km/sec
The TOTAL velocity at 12: 8 = 421. km/sec

The TANGENTIAL velocity at 12:11 = 0.000E+00 km/sec
The TOTAL velocity at 12:11 = 440. km/sec

The TANGENTIAL velocity at 12:16 = 0.000E+00 km/sec
The TOTAL velocity at 12:16 = 473. km/sec

The TANGENTIAL velocity at 12:20 = 0.000E+00 km/sec
The TOTAL velocity at 12:20 = 494. km/sec

The TANGENTIAL velocity at 12:21 = 0.000E+00 km/sec
The TOTAL velocity at 12:21 = 506. km/sec

The TANGENTIAL velocity at 12:24 = 0.000E+00 km/sec
The TOTAL velocity at 12:24 = 525. km/sec

The TANGENTIAL velocity at 12:29 = 0.000E+00 km/sec
The TOTAL velocity at 12:29 = 558. km/sec

****
The following info is for estimating goodness of the fit
****

Fit is ok [ier=1]

Standard Deviation in the height = 0.43
Standard Deviation in start time measurement =   0.106E+02
Value of reduced Chi Squared returned from nllst2 = 0.185E-02
Reduced Chi Squared = 0.139E-01
Chi Squared = 0.970E-01
The probability for exceeding chi square = 0.100E+01

For a second order fit 3 correlation coefficients are given:
 (Using equation of motion: $r = a + bt + at^{**}2$)
The correlation between the data and the term linear in time =   0.9915E+00
The correlation between the data and the time**2 term =   0.9792E+00
The correlation between the data and the complete equation of motion =   0.9910E+00
SEE BEVINGTON "Data Reduction and Error Analysis" [1969]