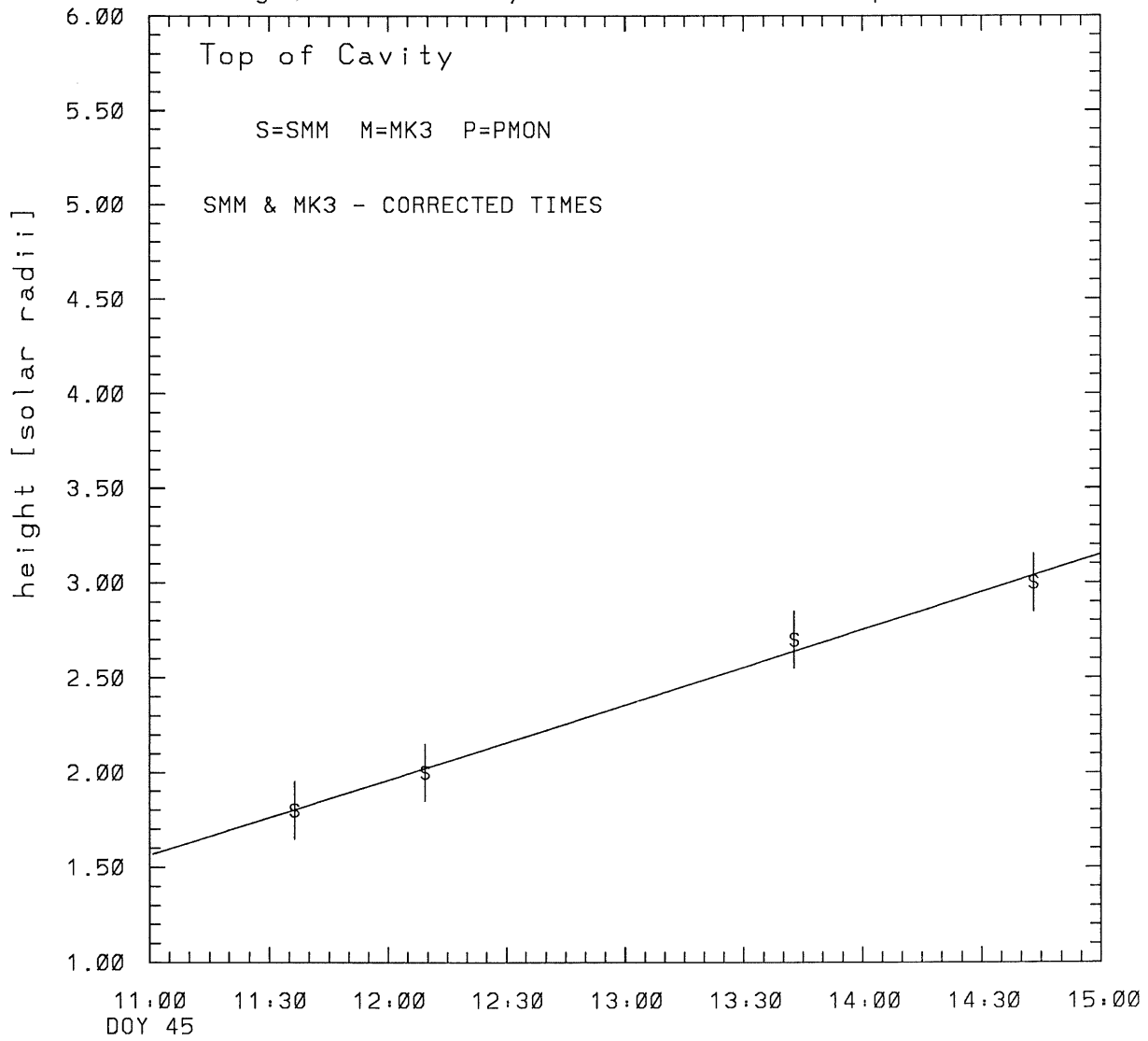


SMM C/P 1989 DOY 45 60 +/- 0 degrees

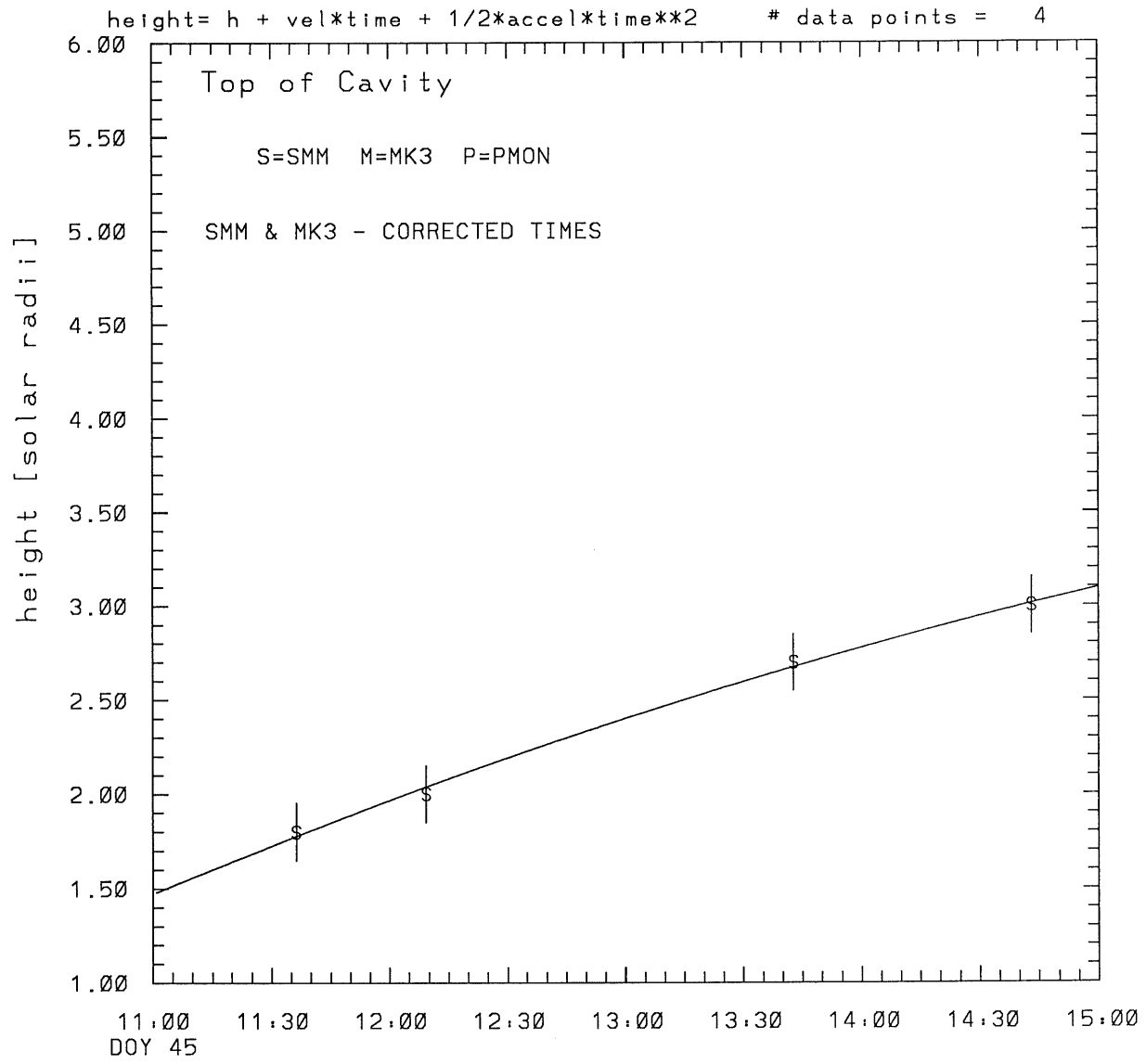
height = h + velocity\*time

# data points = 4



tstart=DOY 45 9:35 +/- 1.7 [min.]  
radial velocity= 77. +/- 3. [km/sec]

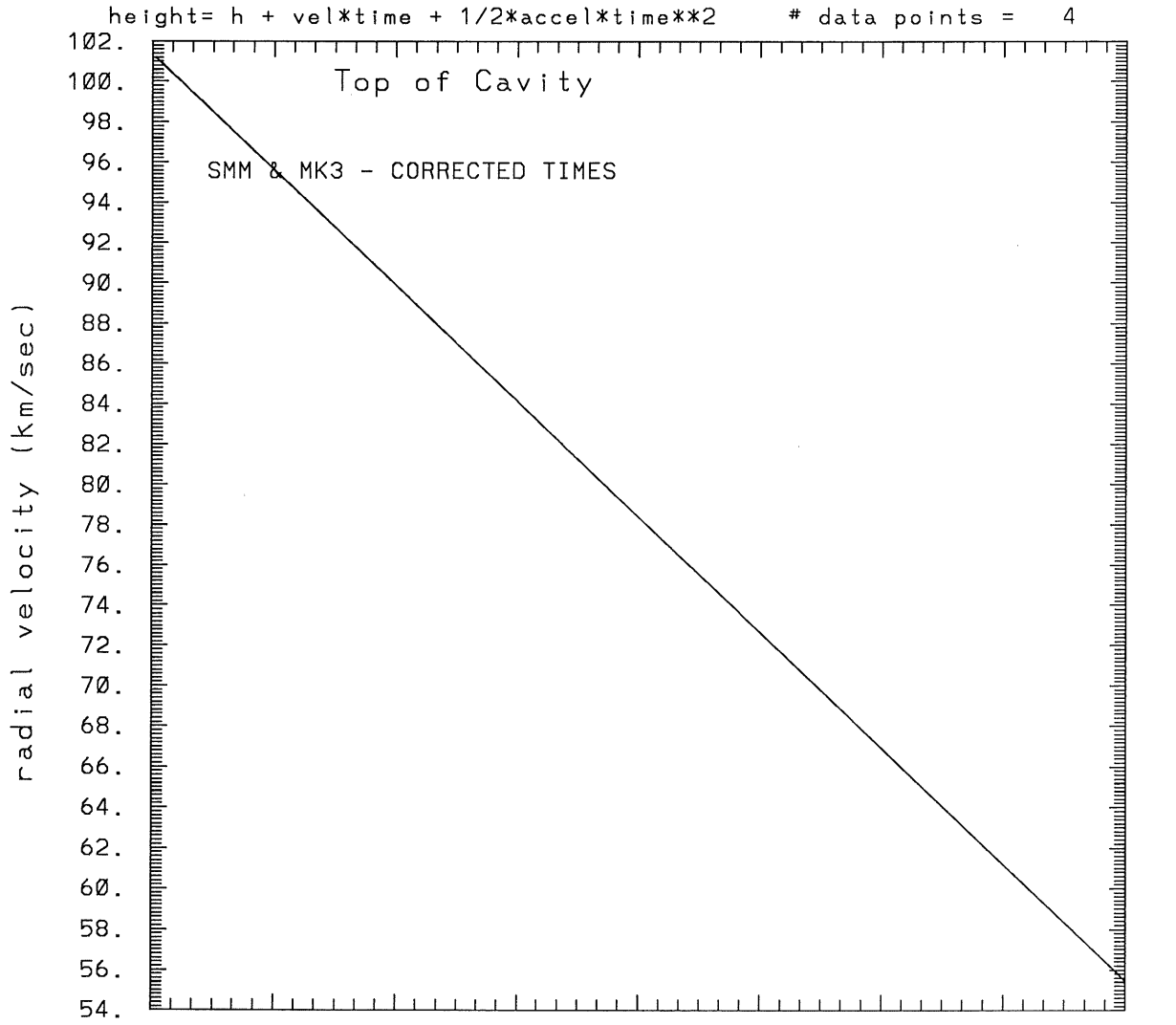
SMM C/P 1989 DOY 45 60 +/- 0 degrees



tstart=DOY 45 10: 9 +/- 21.8 [min.]

radial acceleration=-0.0032 +/- 0.0021 [km/sec\*\*2]

SMM C/P 1989 DOY 45 60 +/- 0 degrees

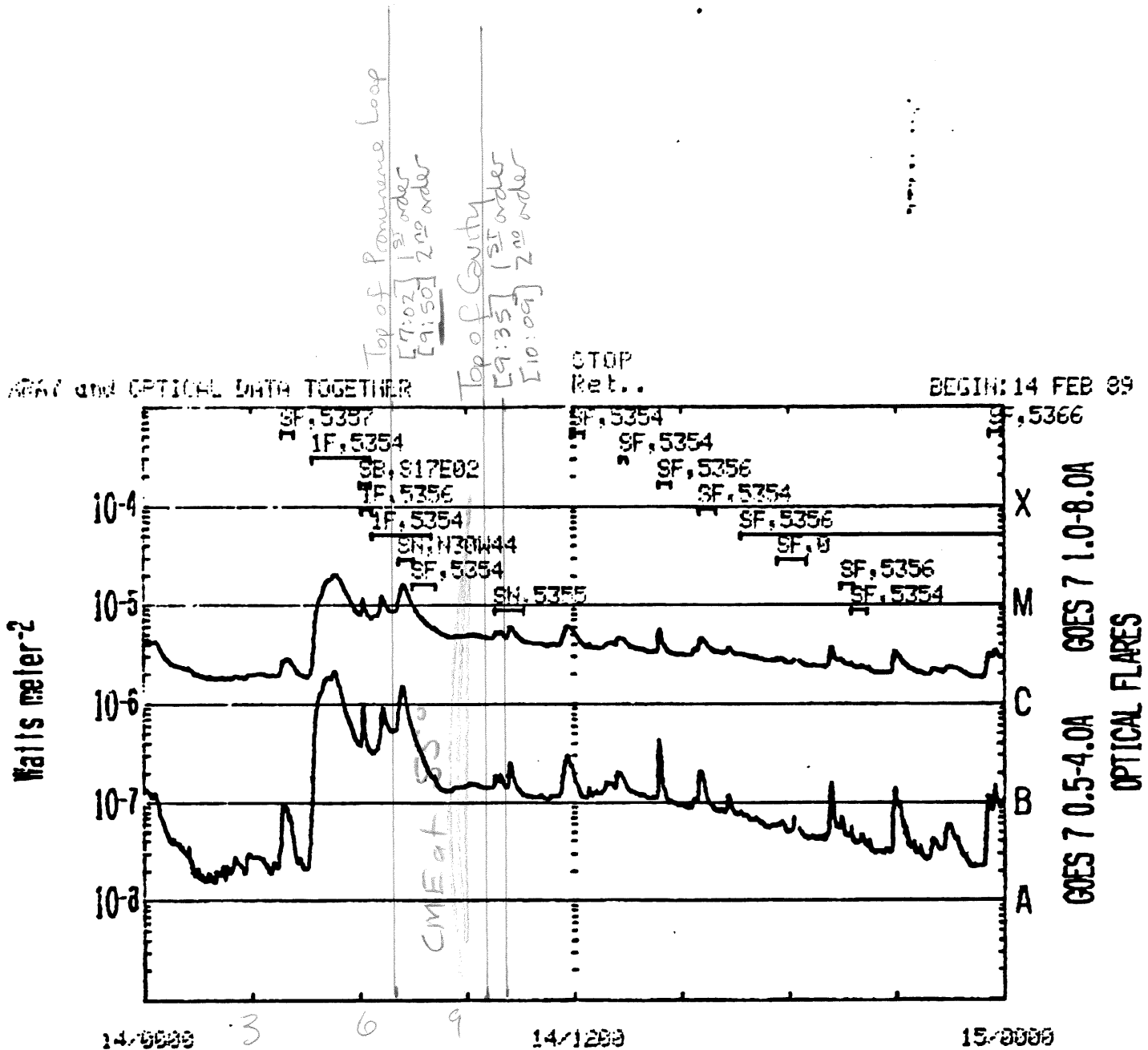


DOY 45

tstart=DOY 45 10: 9 +/- 21.8 [min.]

radial acceleration=-.319E-02 km/sec\*\*2

1989 Day 45



GOES-7 1 MIN DATA; OPTICAL FLARE DUR. IMP. REGION

SAA's NIGHT

RUN: 155LUT  
15 FEB 89

→ 24 hour plot ←

\*\*\*\*\*  
This is a 1 order run  
\*\*\*\*\*

\*\*\*\*\*  
INPUT:  
\*\*\*\*\*

year	day	time	radii	error in radius	angle	error in angle	datatype
1989	45	11:36:18	1.80	+/- 0.15	60.0	+/- 0.5	SMM
1989	45	12: 9:21	2.00	+/- 0.15	60.0	+/- 0.5	SMM
1989	45	13:42:49	2.70	+/- 0.15	60.0	+/- 0.5	SMM
1989	45	14:43: 7	3.00	+/- 0.15	60.0	+/- 0.5	SMM

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

\*\*\*\*\*  
OUTPUT:  
\*\*\*\*\*

START TIME:

Event began at  $t = 0 + -0.851E+02 +/- 0.166E+01$  [minutes]  
In more convenient units:  
Event began at DOY 45 9:35 +/- 0.166E+01 [minutes]

Origin defined at DOY 45 11: 0

RADIAL INFORMATION:

RADIAL VELOCITY = 77. +/- 3. km/sec

The computed RADIAL coefficients and errors FROM NLLST2 are:

c(1) = 0.156E+01 +/- 0.418E-01 [solar radii]  
c(2) = 0.661E-02 +/- 0.291E-03 [radii/min]  
c(2) = 0.767E+02 +/- 0.338E+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)= 0.51157E-01 [radii] see Bevington pg. 114  
error in c(2)= 0.35639E-03 [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) = 60. +/- 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 11:36 = 0. km/sec

The TOTAL velocity at 11:36 = 77. km/sec

The TANGENTIAL velocity at 12: 9 = 0. km/sec

The TOTAL velocity at 12: 9 = 77. km/sec

The TANGENTIAL velocity at 13:42 = 0. km/sec

The TOTAL velocity at 13:42 = 77. km/sec

The TANGENTIAL velocity at 14:43 = 0. km/sec

The TOTAL velocity at 14:43 = 77. km/sec

\*\*\*\*\*

The following info is for estimating goodness of the fit

\*\*\*\*\*

Fit is ok [ier=1]

Standard Deviation in the height = 0.57

Standard Deviation in start time measurement = 0.742E+02

Error in time = 0.11308E+02 using best fit method

See Taylor Error Analysis [Univ of Colorado] pg.78

Value of reduced Chi Squared returned from nllst2 = 0.186E-02

Reduced Chi Squared = 0.887E-02

Chi Squared = 0.177E-01

The probability for exceeding chi square = 0.998E+00

The correlation coefficient = 0.997E+00

The probability that no LINEAR correlation exists between the variables = 0.2894E-02

SEE BEVINGTON "Data Reduction and Error Analysis" [1969]

\*\*\*\*\*

This is a 2 order run

\*\*\*\*\*

\*\*\*\*\*

INPUT:

\*\*\*\*\*

year	day	time	radii	error in radius	error in angle	datatype
1989	45	11:36:18	1.80	+/- 0.15	60.0 +/- 0.5	SMM
1989	45	12: 9:21	2.00	+/- 0.15	60.0 +/- 0.5	SMM
1989	45	13:42:49	2.70	+/- 0.15	60.0 +/- 0.5	SMM
1989	45	14:43: 7	3.00	+/- 0.15	60.0 +/- 0.5	SMM

\*\*\*\*\*

Structure being measured:

Top of Cavity

\*\*\*\*\*

\*\*\*\*\*

OUTPUT:

\*\*\*\*\*

START TIME:

Event began at  $t = 0 + -0.514E+02 +/- 0.218E+02$  [minutes]

In more convenient units:

Event began at DOY 45 10: 9 +/- 0.218E+02 [minutes]

Origin defined at DOY 45 11: 0

RADIAL INFORMATION:

RADIAL ACCELERATION =  $-0.319E-02 +/- 0.212E-02$  km/sec\*\*2

The computed RADIAL coefficients and errors FROM NLLST2 are:

c(1) =  $0.147E+01 +/- 0.703E-01$  [solar radii]  
c(2) =  $0.874E-02 +/- 0.144E-02$  [radii/min]  
c(2) =  $0.101E+03 +/- 0.167E+02$  [km/sec]  
c(3) =  $-0.824E-05 +/- 0.549E-05$  [radii/min\*\*2]  
c(3) =  $-0.319E-02 +/- 0.212E-02$  [km/sec\*\*2]

The computed ERRORS in coefficients [BEVINGTON] are:

Approximate error in c(1) =  $0.99442E-01$  [radii] Bevington pg 154 (8-30)  
Exact error in c(1) =  $0.44052E-01$  [radii] Bevington pg 154 (8-28)  
Approximate error in c(2) =  $0.20330E-02$  [radii/min] Bevington pg 154 (8-30)  
Exact error in c(2) =  $0.91488E-03$  [radii/min] Bevington pg 154 (8-28)  
Approximate error in c(3) =  $0.77667E-05$  [radii/min\*\*] Bevington pg 154 (8-30)  
Exact error in c(3) =  $0.33702E-05$  [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) = 60. +/- 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 11:36 = 0. km/sec

The TOTAL velocity at 11:36 = 94. km/sec

The TANGENTIAL velocity at 12: 9 = 0. km/sec

The TOTAL velocity at 12: 9 = 88. km/sec

The TANGENTIAL velocity at 13:42 = 0. km/sec

The TOTAL velocity at 13:42 = 70. km/sec

The TANGENTIAL velocity at 14:43 = 0. km/sec

The TOTAL velocity at 14:43 = 59. km/sec

\*\*\*\*\*

The following info is for estimating goodness of the fit

\*\*\*\*\*

Fit is ok [ier=1]

Standard Deviation in the height = 0.57

Standard Deviation in start time measurement = 0.742E+02

Value of reduced Chi Squared returned from nllst2 = 0.131E-02

Reduced Chi Squared = 0.557E-02

Chi Squared = 0.557E-02

The probability for exceeding chi square = 0.971E+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 = 0.9971E+00

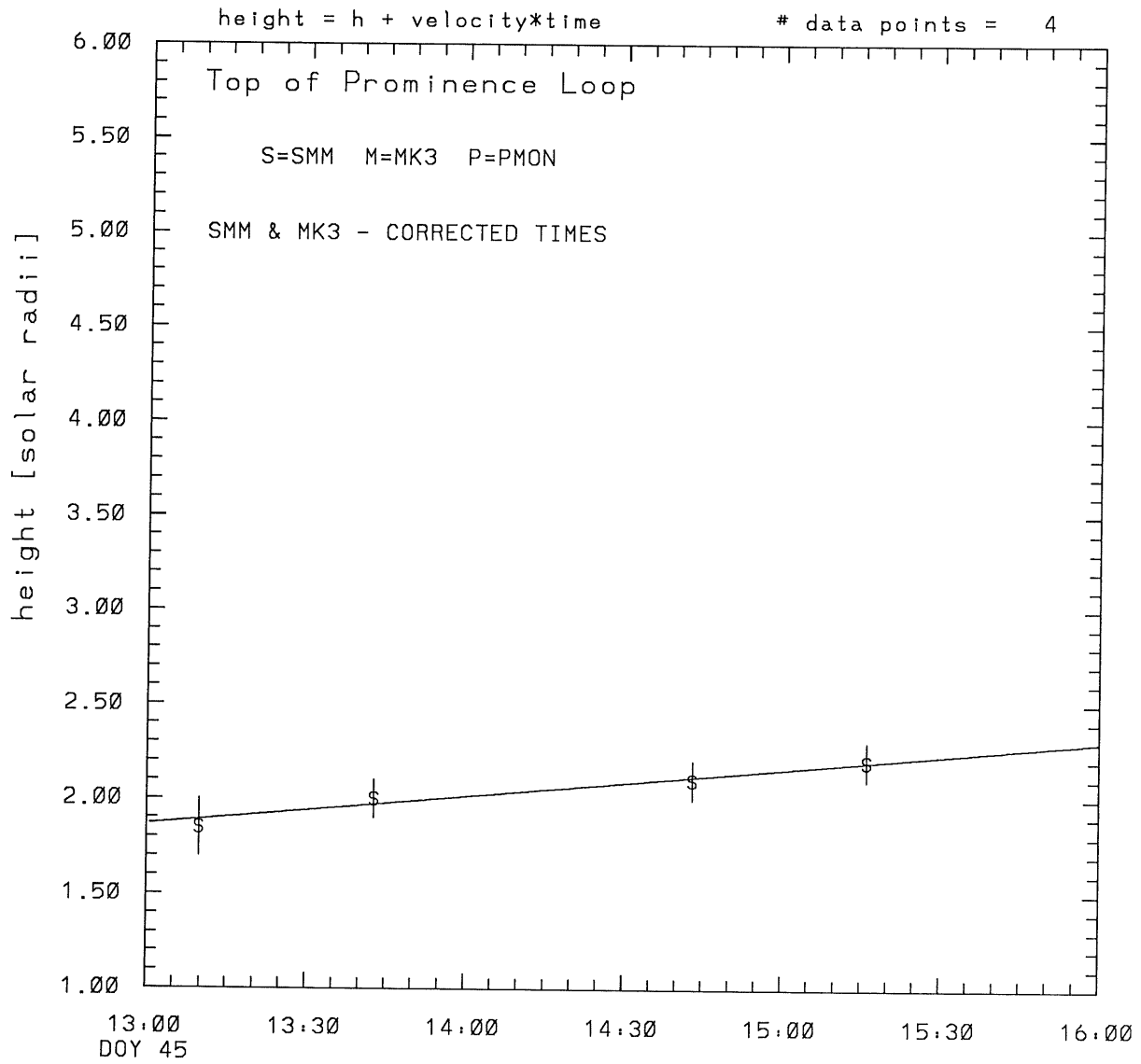
The correlation between the data and the time\*\*2 term = 0.9732E+00

The correlation between the data and the complete equation of motion = 0.9973E+00

SEE BEVINGTON "Data Reduction and Error Analysis" [1969]

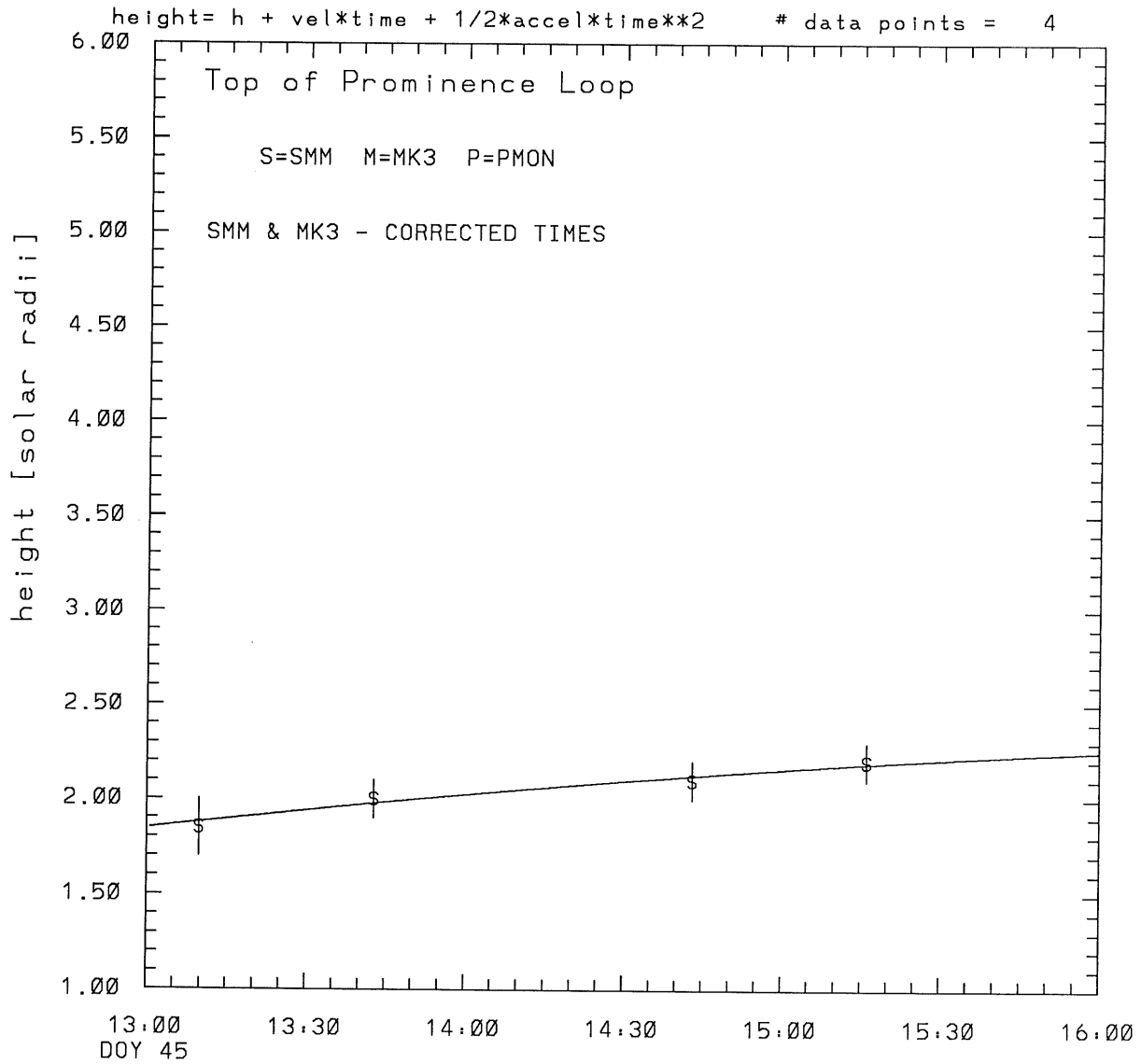


SMM C/P 1989 DOY 45 60 +/- 0 degrees



tstart=DOY 45 7: 2 +/- 22.4 [min.]  
radial velocity= 28. +/- 3. [km/sec]

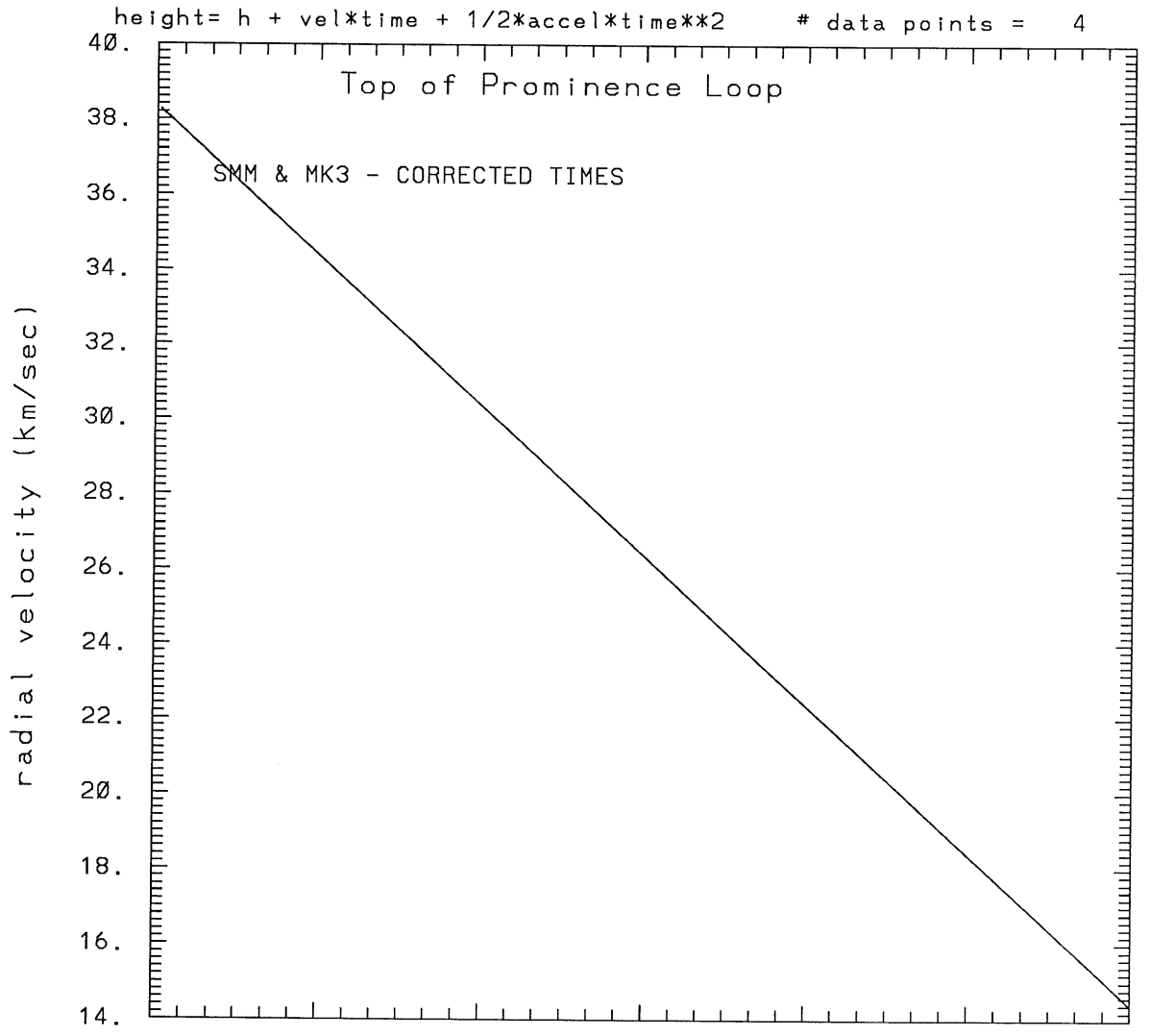
SMM C/P 1989 DOY 45 60 +/- 0 degrees



tstart=DOY 45 9.50 +/- 249.8 [min.]

radial acceleration =  $-0.0022 \pm 0.0041$  [km/sec\*\*2]

SMM C/P 1989 DOY 45 60 +/- 0 degrees



13:00  
DOY 45

tstart=DOY 45 9:50 +/- 249.8 [min.]

radial acceleration=-.222E-02 km/sec\*\*2

\*\*\*\*\*

This is a 1 order run

\*\*\*\*\*

\*\*\*\*\*

INPUT:

\*\*\*\*\*

year	day	time	radii	error in radius	angle	error in angle	datatype
1989	45	13: 9:47	1.85	+/- 0.15	60.0	+/- 0.5	SMM
1989	45	13:42:49	2.00	+/- 0.10	60.0	+/- 0.5	SMM
1989	45	14:43: 7	2.10	+/- 0.10	60.0	+/- 0.5	SMM
1989	45	15:16:10	2.20	+/- 0.10	60.0	+/- 0.5	SMM

\*\*\*\*\*

Structure being measured:

Top of Prominence Loop

\*\*\*\*\*

\*\*\*\*\*

OUTPUT:

\*\*\*\*\*

START TIME:

Event began at  $t = 0 + -0.358E+03 +/- 0.224E+02$  [minutes]

In more convenient units:

Event began at DOY 45 7: 2 +/- 0.224E+02 [minutes]

Origin defined at DOY 45 13: 0

RADIAL INFORMATION:

RADIAL VELOCITY = 28. +/- 3. km/sec

The computed RADIAL coefficients and errors FROM NLLST2 are:

c(1) = 0.187E+01 +/- 0.280E-01 [solar radii]  
c(2) = 0.242E-02 +/- 0.295E-03 [radii/min]  
c(2) = 0.281E+02 +/- 0.342E+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)= 0.33214E-01 [radii] see Bevington pg. 114

error in c(2)= 0.37665E-03 [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) = 60. +/- 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 13: 9 = 0. km/sec

The TOTAL velocity at 13: 9 = 28. km/sec

The TANGENTIAL velocity at 13:42 = 0. km/sec

The TOTAL velocity at 13:42 = 28. km/sec

The TANGENTIAL velocity at 14:43 = 0. km/sec

The TOTAL velocity at 14:43 = 28. km/sec

The TANGENTIAL velocity at 15:16 = 0. km/sec

The TOTAL velocity at 15:16 = 28. km/sec

\*\*\*\*\*

The following info is for estimating goodness of the fit

\*\*\*\*\*

Fit is ok [ier=1]

Standard Deviation in the height = 0.15

Standard Deviation in start time measurement = 0.495E+02

Error in time = 0.21801E+02 using best fit method

See Taylor Error Analysis [Univ of Colorado] pg.78

Value of reduced Chi Squared returned from nllst2 = 0.729E-03

Reduced Chi Squared = 0.212E-02

Chi Squared = 0.424E-02

The probability for exceeding chi square = 0.999E+00

The correlation coefficient = 0.981E+00

The probability that no LINEAR correlation exists between the variables = 0.1854E-01

SEE BEVINGTON "Data Reduction and Error Analysis" [1969]

\*\*\*\*\*  
This is a 2 order run  
\*\*\*\*\*

\*\*\*\*\*  
INPUT:  
\*\*\*\*\*

year	day	time	radii	error in radius	error in angle	datatype
1989	45	13: 9:47	1.85	+/- 0.15	60.0 +/- 0.5	SMM
1989	45	13:42:49	2.00	+/- 0.10	60.0 +/- 0.5	SMM
1989	45	14:43: 7	2.10	+/- 0.10	60.0 +/- 0.5	SMM
1989	45	15:16:10	2.20	+/- 0.10	60.0 +/- 0.5	SMM

\*\*\*\*\*  
Structure being measured:  
Top of Prominence Loop  
\*\*\*\*\*

\*\*\*\*\*  
OUTPUT:  
\*\*\*\*\*

START TIME:

Event began at  $t = 0 + -0.192E+03 +/- 0.250E+03$  [minutes]  
In more convenient units:  
Event began at DOY 45 9:50 +/- 0.250E+03 [minutes]

Origin defined at DOY 45 13: 0

RADIAL INFORMATION:

RADIAL ACCELERATION =  $-0.222E-02 +/- 0.406E-02$  km/sec\*\*2

The computed RADIAL coefficients and errors FROM NLLST2 are:

c(1) =  $0.184E+01 +/- 0.515E-01$  [solar radii]  
c(2) =  $0.331E-02 +/- 0.166E-02$  [radii/min]  
c(2) =  $0.383E+02 +/- 0.192E+02$  [km/sec]  
c(3) =  $-0.573E-05 +/- 0.105E-04$  [radii/min\*\*2]  
c(3) =  $-0.222E-02 +/- 0.406E-02$  [km/sec\*\*2]

The computed ERRORS in coefficients [BEVINGTON] are:

Approximate error in c(1) =  $0.57969E-01$  [radii] Bevington pg 154 (8-30)  
Exact error in c(1) =  $0.32992E-01$  [radii] Bevington pg 154 (8-28)  
Approximate error in c(2) =  $0.21760E-02$  [radii/min] Bevington pg 154 (8-30)  
Exact error in c(2) =  $0.11522E-02$  [radii/min] Bevington pg 154 (8-28)  
Approximate error in c(3) =  $0.14581E-04$  [radii/min\*\*] Bevington pg 154 (8-30)  
Exact error in c(3) =  $0.71972E-05$  [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) = 60. +/- 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 13: 9 = 0. km/sec

The TOTAL velocity at 13: 9 = 37. km/sec

The TANGENTIAL velocity at 13:42 = 0. km/sec

The TOTAL velocity at 13:42 = 33. km/sec

The TANGENTIAL velocity at 14:43 = 0. km/sec

The TOTAL velocity at 14:43 = 25. km/sec

The TANGENTIAL velocity at 15:16 = 0. km/sec

The TOTAL velocity at 15:16 = 20. km/sec

\*\*\*\*\*

The following info is for estimating goodness of the fit

\*\*\*\*\*

Fit is ok [ier=1]

Standard Deviation in the height = 0.15

Standard Deviation in start time measurement = 0.495E+02

Value of reduced Chi Squared returned from nllst2 = 0.951E-03

Reduced Chi Squared = 0.422E-02

Chi Squared = 0.422E-02

The probability for exceeding chi square = 0.975E+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 = 0.9278E+00

The correlation between the data and the time\*\*2 term = 0.9354E+00

The correlation between the data and the complete equation of motion = 0.9573E+00

SEE BEVINGTON "Data Reduction and Error Analysis" [1969]