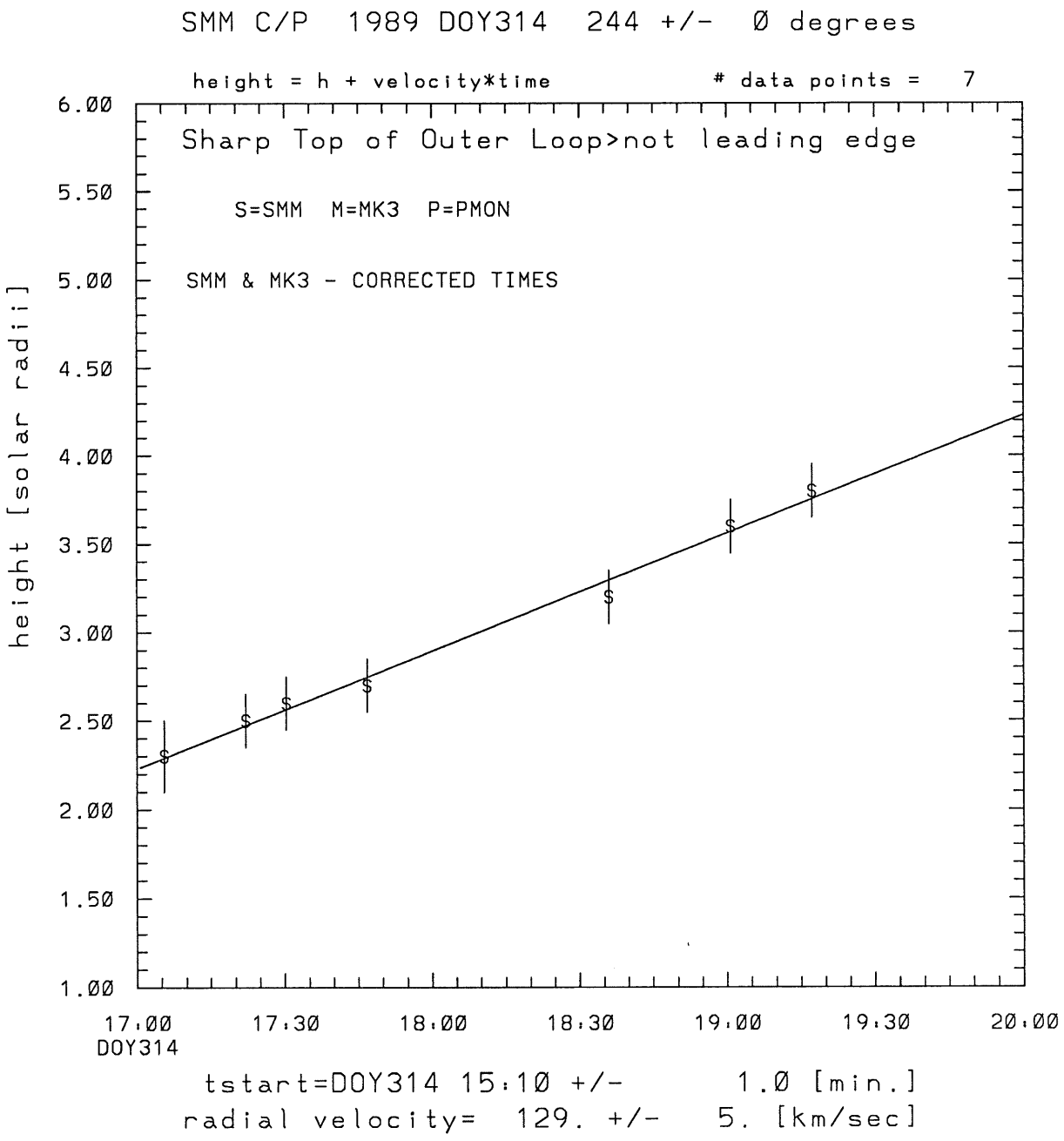
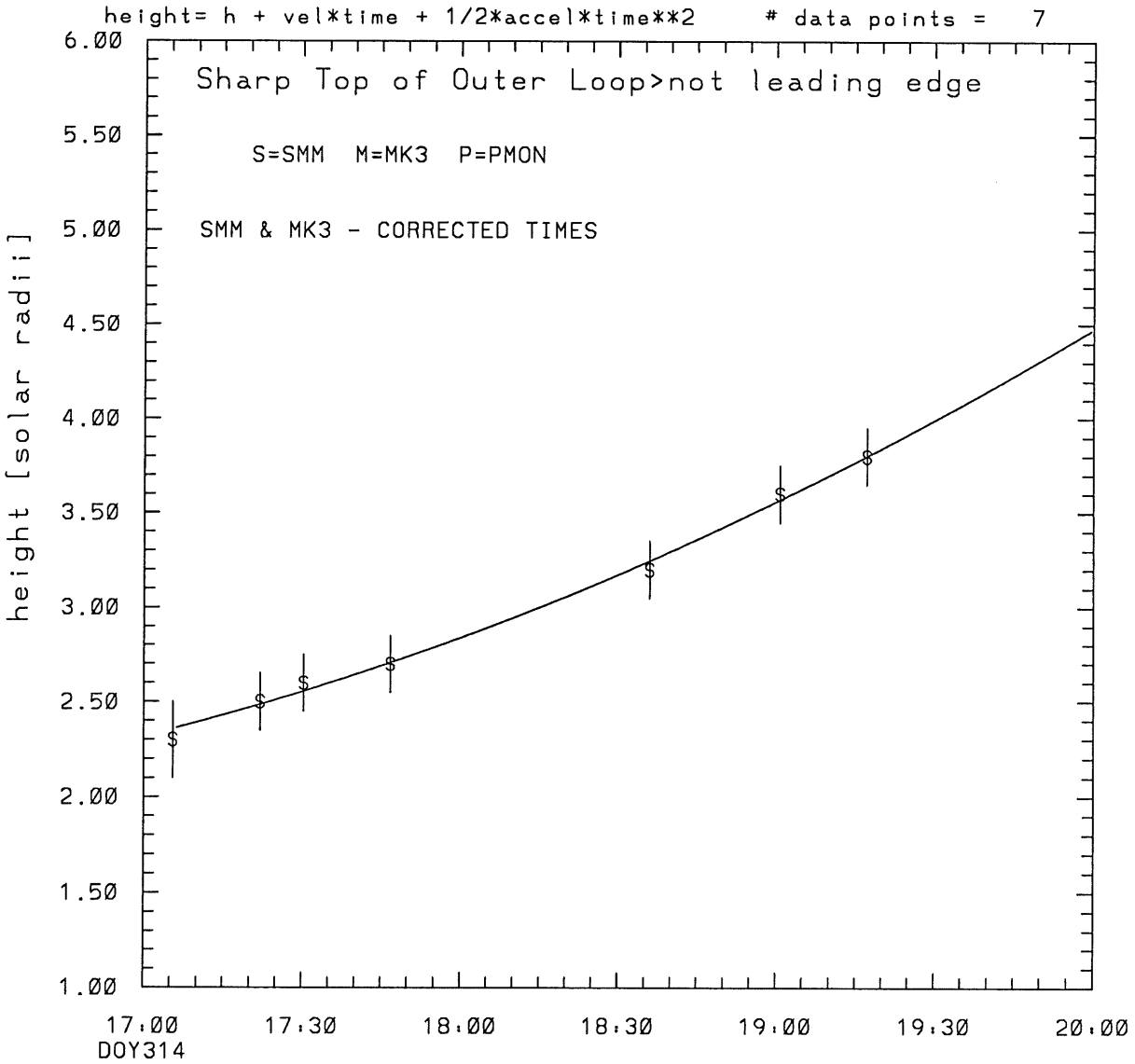

SMM C/P 1989 DOY314 244 +/- Ø degrees
height = h + velocity*time
# data points = 7
Sharp Top of Outer Loop>not leading edge
S=SMM M=MK3 P=PMON
SMM & MK3 - CORRECTED TIMES
height [solar radii]
6.ØØ
5.5Ø
5.ØØ
4.5Ø
4.ØØ
3.5Ø
3.ØØ
2.5Ø
2.ØØ
1.5Ø
1.ØØ
17:ØØ
DOY314
17:3Ø
18:ØØ
18:3Ø
19:ØØ
19:3Ø
2Ø:ØØ
tstart=DOY314 15:1Ø +/- 1.Ø [min.]
radial velocity= 129. +/- 5. [km/sec]

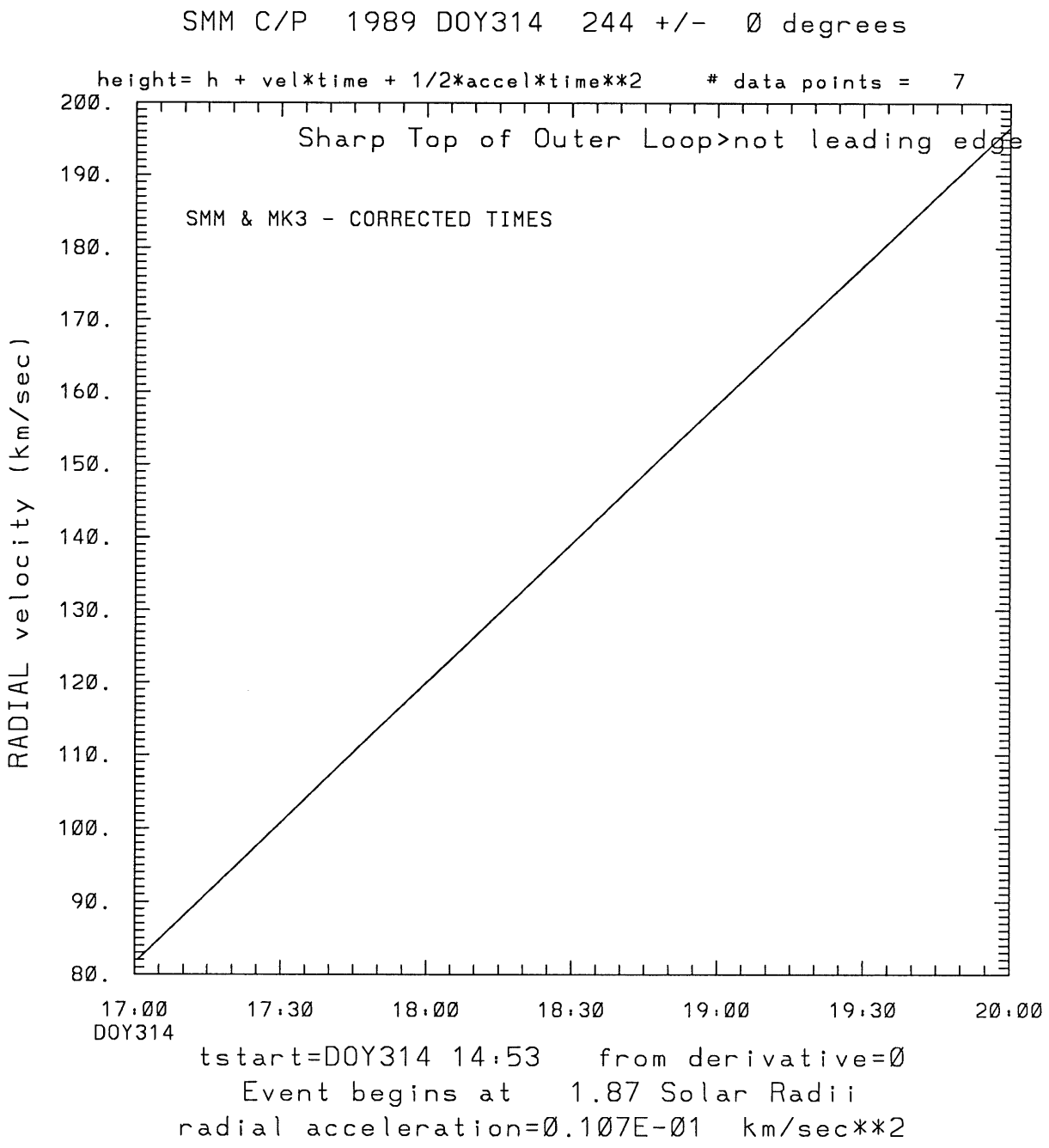
SMM C/P 1989 DOY314 244 +/- Ø degrees



tstart=DOY314 14:53 from derivative=Ø

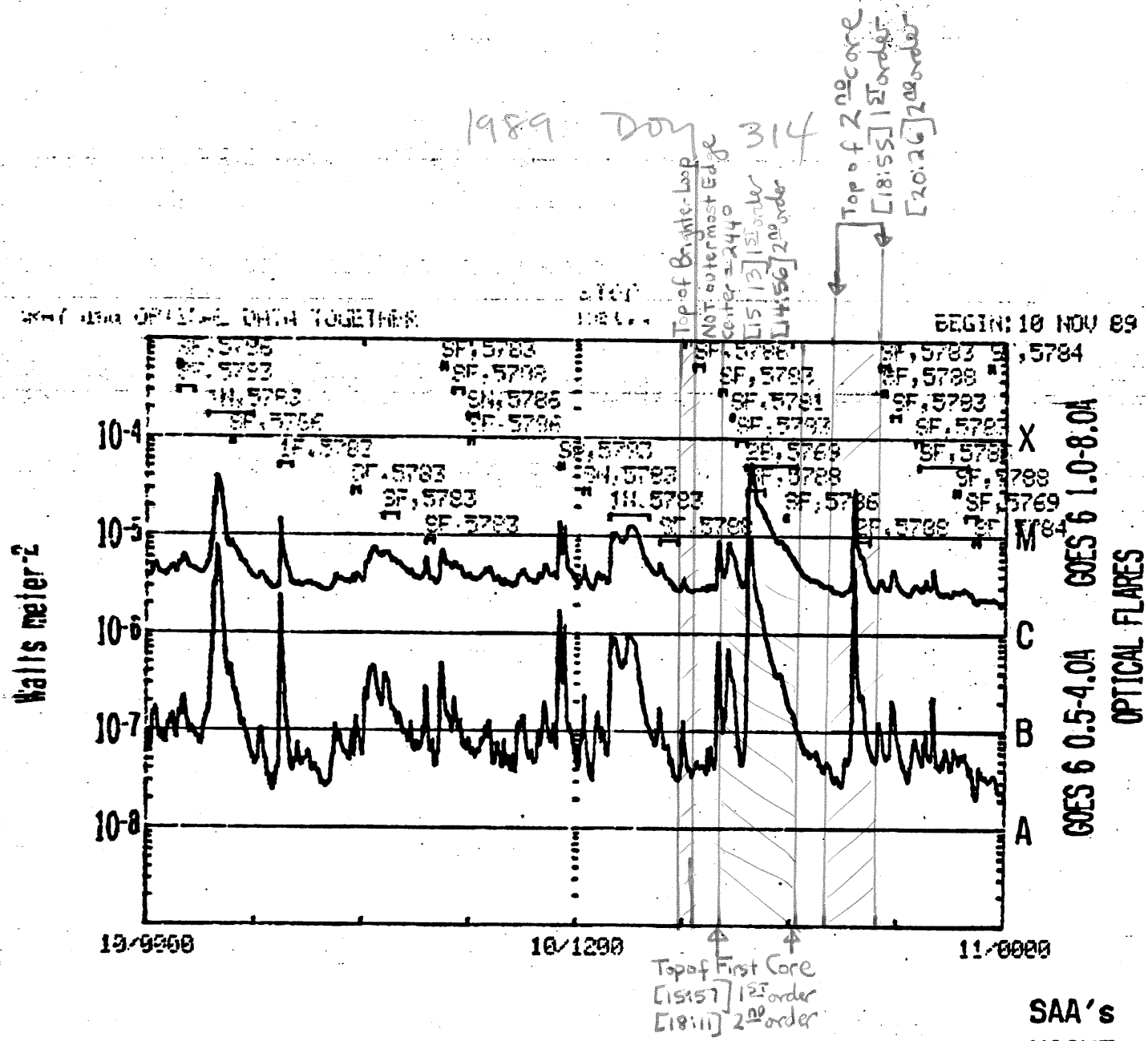
Event begins at 1.87 Solar Radii

radial acceleration= Ø.Ø1Ø7 +/- Ø.ØØ42 [km/sec**2]


SMM C/P 1989 DOY314 244 +/- Ø degrees
height= h + vel*time + 1/2*accel*time**2 # data points = 7
Sharp Top of Outer Loop>not leading edge
SMM & MK3 - CORRECTED TIMES
RADIAL velocity (km/sec)
200.
190.
180.
170.
160.
150.
140.
130.
120.
110.
100.
90.
80.
17:00
DOY314
17:30
18:00
18:30
19:00
19:30
20:00
tstart=DOY314 14:53 from derivative=Ø
Event begins at 1.87 Solar Radii
radial acceleration=Ø.107E-Ø1 km/sec**2

→ 24 hour plot ←

1989 DOY 314



GOES-6 1 MIN DATA: OPTICAL FLARE DUR. IMP. REGION

→ 24 hour plot ←

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

****
 INPUT:
****

year	doy	time	radii	error in radius	angle	error in angle	datatype
1989	314	17: 5:31	2.30	+/- 0.20	244.0	+/- 0.5	SMM
1989	314	17:22: 3	2.50	+/- 0.15	244.0	+/- 0.5	SMM
1989	314	17:30:17	2.60	+/- 0.15	244.0	+/- 0.5	SMM
1989	314	17:46:47	2.70	+/- 0.15	244.0	+/- 0.5	SMM
1989	314	18:36: 1	3.20	+/- 0.15	244.0	+/- 1.0	SMM
1989	314	19: 0:47	3.60	+/- 0.15	244.0	+/- 1.0	SMM
1989	314	19:17:17	3.80	+/- 0.15	244.0	+/- 1.0	SMM

****
 Structure being measured:
Sharp Top of Outer Loop>not leading edge
****

****
 OUTPUT:
****

START TIME:

 Event began at t = 0 + -0.110E+03 +/- 0.100E+01 [minutes]
 In more convenient units:
 Event began at DOY 314 15:10 +/- 0.100E+01 [minutes]

 Origin defined at DOY314 17: 0

RADIAL INFORMATION:

RADIAL VELOCITY =   129. +/-   5. km/sec

The computed RADIAL coefficients and errors FROM NLLST2 are:

 c(1) =   0.223E+01 +/-   0.364E-01 [solar radii]
 c(2) =   0.111E-01 +/-   0.434E-03 [radii/min]
 c(2) =   0.129E+03 +/-   0.503E+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)= 0.36636E-01 [radii] see Bevington pg. 114
                  error in c(2)= 0.45058E-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) = 244. +/-   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 RADIAL velocity at 17: 5 = 129. km/sec

The RADIAL velocity at 17:22 = 129. km/sec

```
The RADIAL velocity at 17:30 =  129. km/sec

The RADIAL velocity at 17:46 =  129. km/sec

The RADIAL velocity at 18:36 =  129. km/sec

The RADIAL velocity at 19: 0 =  129. km/sec

The RADIAL velocity at 19:17 =  129. km/sec


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

 Fit is ok [ier=1]

 Standard Deviation in the height =  0.58
 Standard Deviation in start time measurement =    0.481E+02
 Error in time =        0.11532E+02 using best fit method
 See Taylor Error Analysis [Univ of Colorado] pg.78

 Value of reduced Chi Squared returned from nllst2 = 0.292E-02
 Reduced Chi Squared = 0.159E-01
 Chi Squared = 0.797E-01
 The probability for exceeding chi square = 0.100E+01

 The correlation coefficient =    0.996E+00
 The probability that no LINEAR correlation exists between the variables =   0.2047
 SEE BEVINGTON "Data Reduction and Error Analysis" [1969]
```

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

****
 INPUT:
****

year	doy	time	radii	error in radius	angle	error in angle	datatype
1989	314	17: 5:31	2.30 +/-	0.20	244.0 +/-	0.5	SMM
1989	314	17:22: 3	2.50 +/-	0.15	244.0 +/-	0.5	SMM
1989	314	17:30:17	2.60 +/-	0.15	244.0 +/-	0.5	SMM
1989	314	17:46:47	2.70 +/-	0.15	244.0 +/-	0.5	SMM
1989	314	18:36: 1	3.20 +/-	0.15	244.0 +/-	1.0	SMM
1989	314	19: 0:47	3.60 +/-	0.15	244.0 +/-	1.0	SMM
1989	314	19:17:17	3.80 +/-	0.15	244.0 +/-	1.0	SMM

****
 Structure being measured:
Sharp Top of Outer Loop>not leading edge
****

****
 OUTPUT:
****

START TIME:

 tstart=DOY314 14:53 from derivative = 0
Event begins at   1.87 Solar Radii
 Origin defined at DOY314 17: 0

RADIAL INFORMATION:

RADIAL ACCELERATION = 0.107E-01 +/- 0.421E-02 km/sec**2

The computed RADIAL coefficients and errors FROM NLLST2 are:

 c(1) =   0.232E+01 +/-   0.444E-01 [solar radii]
 c(2) =   0.703E-02 +/-   0.165E-02 [radii/min]
 c(2) =   0.816E+02 +/-   0.191E+02 [km/sec]
 c(3) =   0.275E-04 +/-   0.109E-04 [radii/min**2]
 c(3) =   0.107E-01 +/-   0.421E-02 [km/sec**2]

 The computed ERRORS in coefficients [BEVINGTON] are:

    Approximate error in c(1) = 0.45854E-01 [radii] Bevington pg 154 (8-30)
          Exact error in c(1) = 0.13920E-01 [radii] Bevington pg 154 (8-28)
    Approximate error in c(2) = 0.18054E-02 [radii/min] Bevington pg 154 (8-30)
          Exact error in c(2) = 0.43797E-03 [radii/min] Bevington pg 154 (8-28)
    Approximate error in c(3) = 0.12238E-04 [radii/min**2] Bevington pg 154 (8-30)
          Exact error in c(3) = 0.24839E-05 [radii/min**2] Bevington pg 154 (8-28)

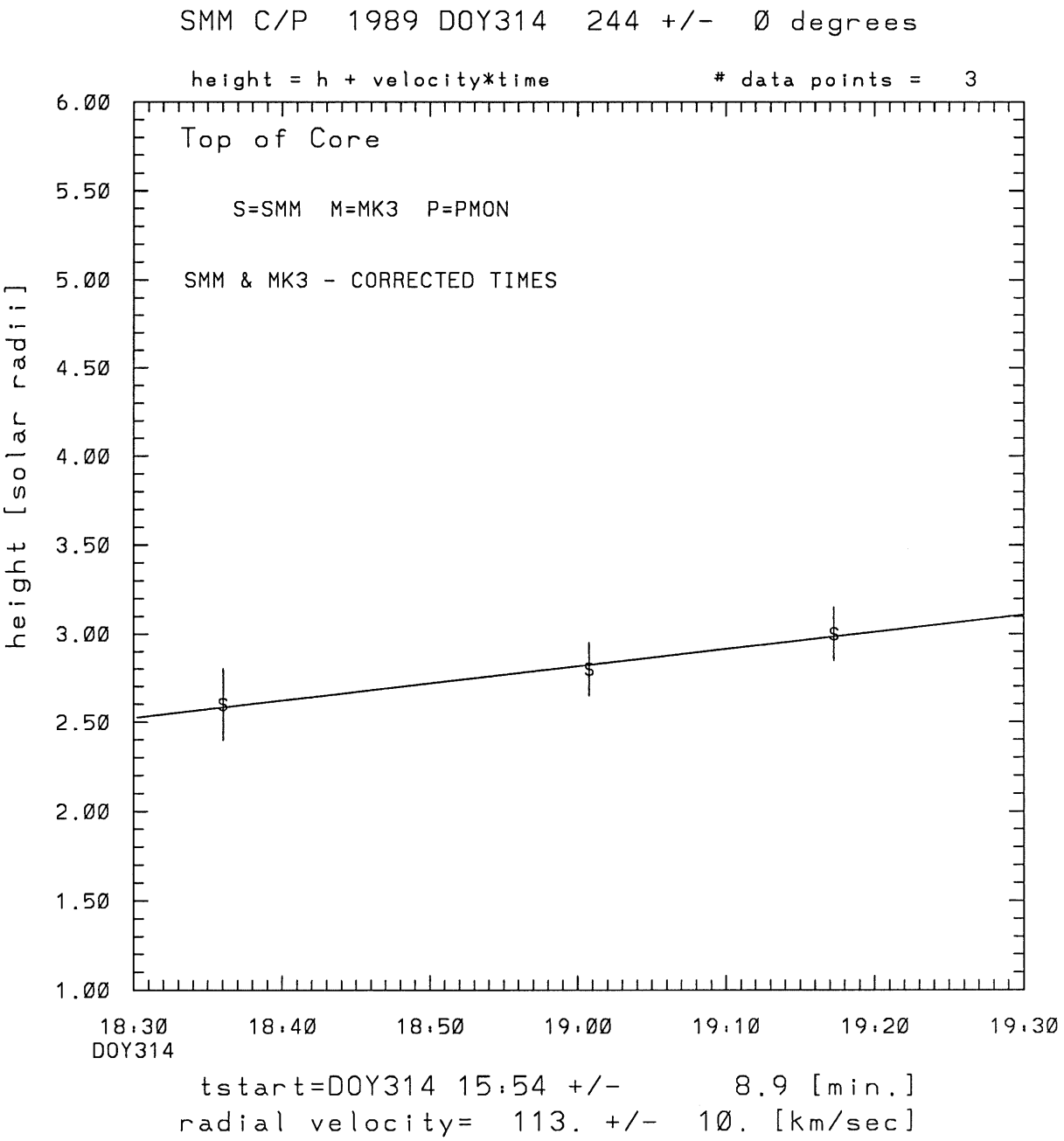
ANGULAR INFORMATION:

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

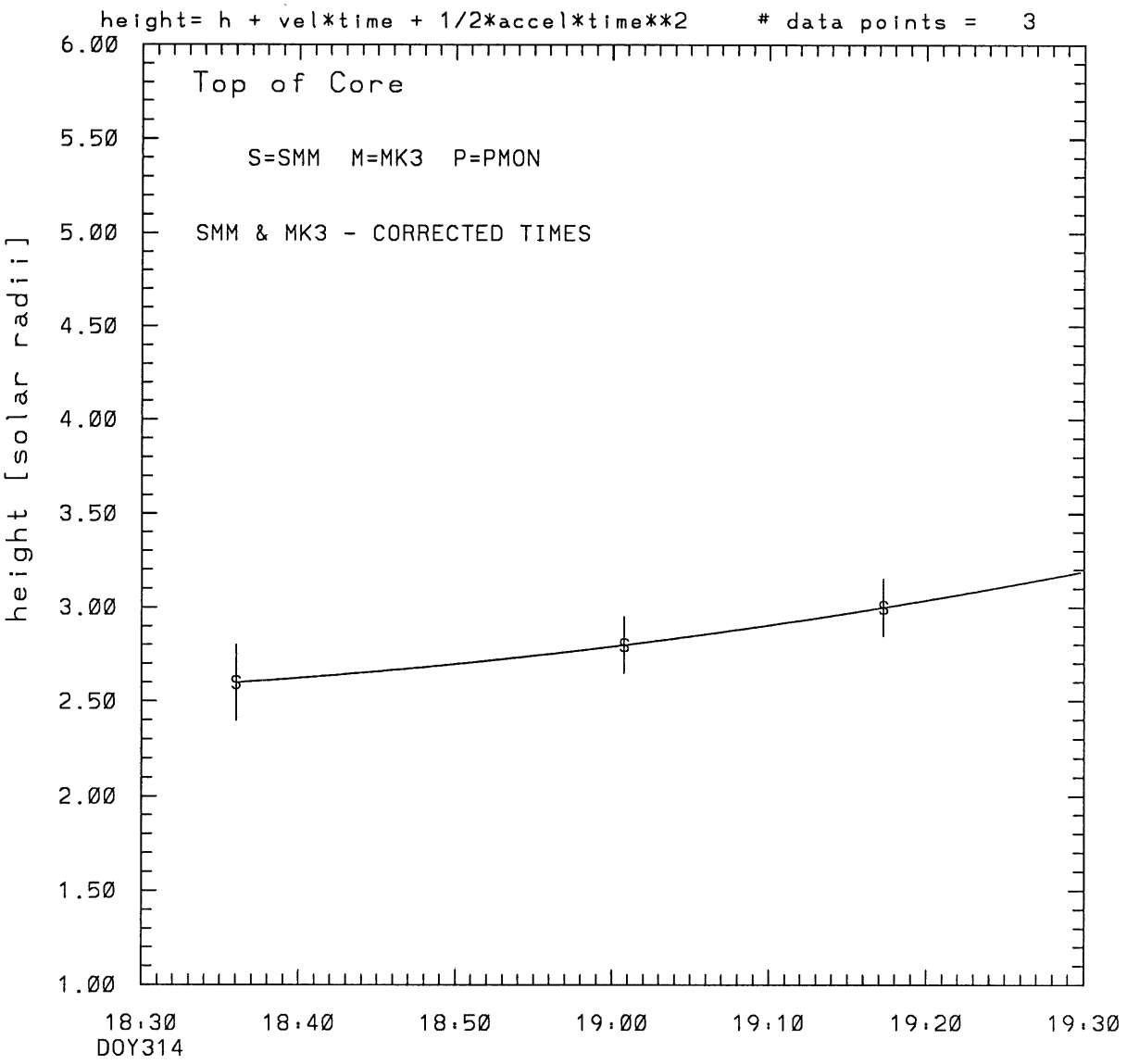
The computed ANGULAR coefficients and errors FROM NLLST2 are:

 a(1) = 244. +/-   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 RADIAL velocity at 17: 5 =   85. km/sec

The RADIAL velocity at 17:22 =   96. km/sec

The RADIAL velocity at 17:30 =  101. km/sec

The RADIAL velocity at 17:46 =  111. km/sec

The RADIAL velocity at 18:36 =  143. km/sec

The RADIAL velocity at 19: 0 =  159. km/sec

The RADIAL velocity at 19:17 =  169. km/sec

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

 Fit is ok [ier=1]

 Standard Deviation in the height =  0.58
 Standard Deviation in start time measurement =    0.481E+02
 Value of reduced Chi Squared returned from nllst2 = 0.154E-02
 Reduced Chi Squared = 0.663E-02
 Chi Squared = 0.265E-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  =   0.9769E+00
 The correlation between the data and the time**2 term =   0.9952E+00
 The correlation between the data and the complete equation of motion=0.9955E+00
 SEE BEVINGTON "Data Reduction and Error Analysis" [1969]
```


SMM C/P 1989 DOY314 244 +/- Ø degrees
height = h + velocity*time
# data points = 3
Top of Core
S=SMM M=MK3 P=PMON
SMM & MK3 - CORRECTED TIMES
height [solar radii]
6.ØØ
5.5Ø
5.ØØ
4.5Ø
4.ØØ
3.5Ø
3.ØØ
2.5Ø
2.ØØ
1.5Ø
1.ØØ
18:3Ø
DOY314
18:4Ø
18:5Ø
19:ØØ
19:1Ø
19:2Ø
19:3Ø
tstart=DOY314 15:54 +/- 8.9 [min.]
radial velocity= 113. +/- 1Ø. [km/sec]

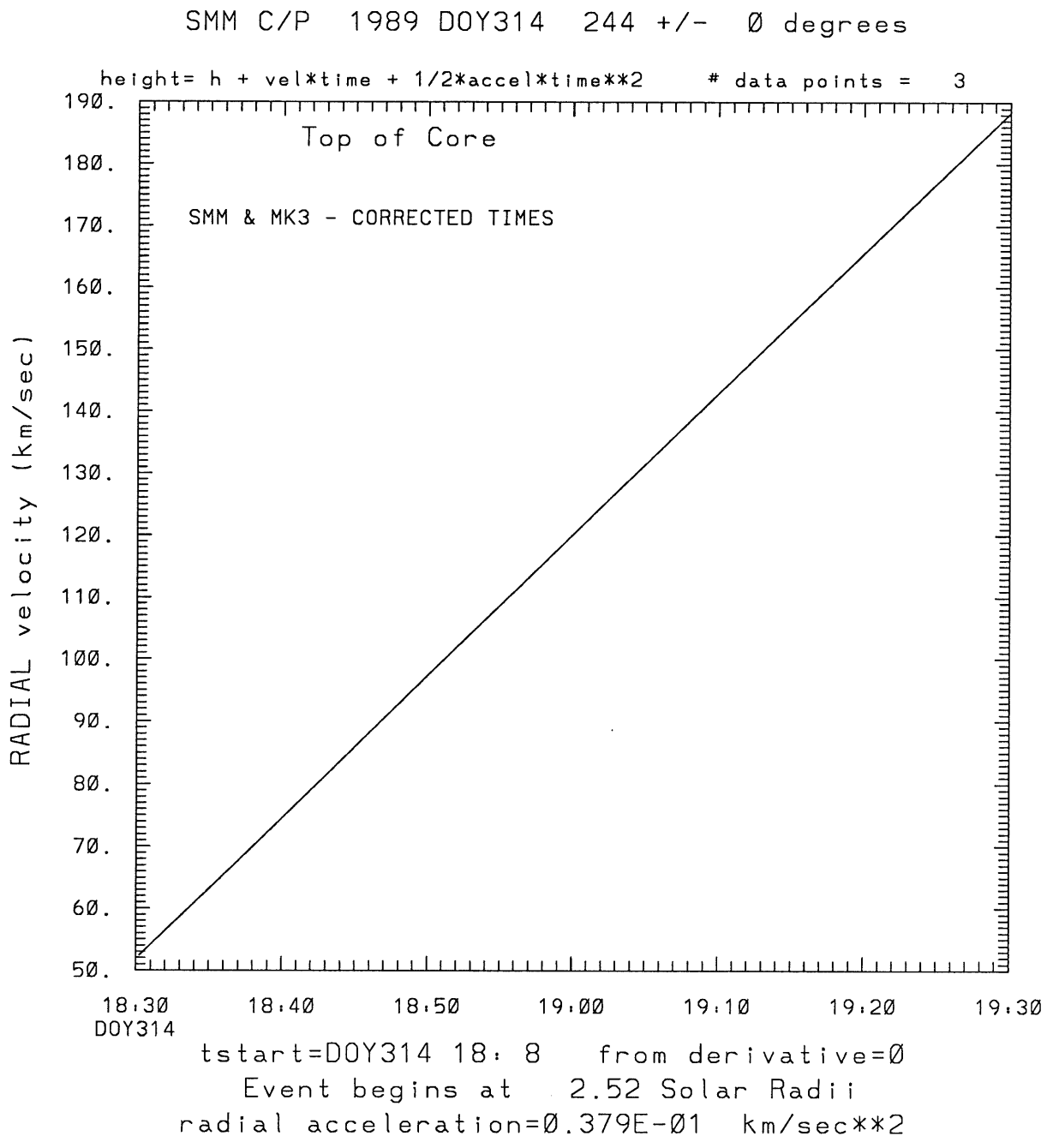
SMM C/P 1989 DOY314 244 +/- Ø degrees



tstart=DOY314 18: 8 from derivative=Ø

Event begins at 2.52 Solar Radii

radial acceleration= Ø.Ø379 +/- Ø.ØØØØ [km/sec**2]

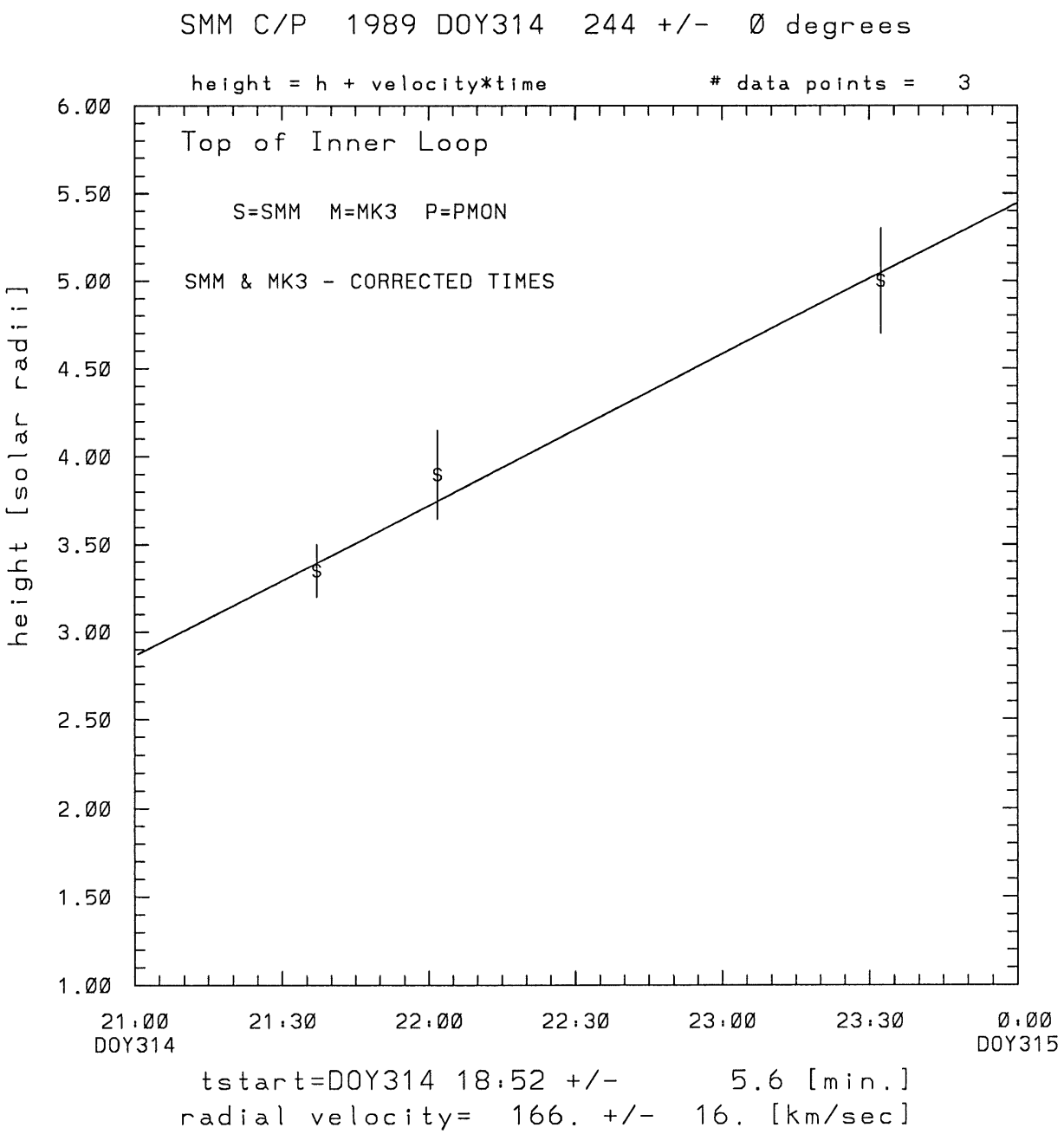

SMM C/P 1989 DOY314 244 +/- Ø degrees
height= h + vel*time + 1/2*accel*time**2 # data points = 3
Top of Core
SMM & MK3 - CORRECTED TIMES
RADIAL velocity (km/sec)
190.
180.
170.
160.
150.
140.
130.
120.
110.
100.
90.
80.
70.
60.
50.
18:30
DOY314
18:40
18:50
19:00
19:10
19:20
19:30
tstart=DOY314 18: 8 from derivative=Ø
Event begins at 2.52 Solar Radii
radial acceleration=Ø.379E-Ø1 km/sec**2

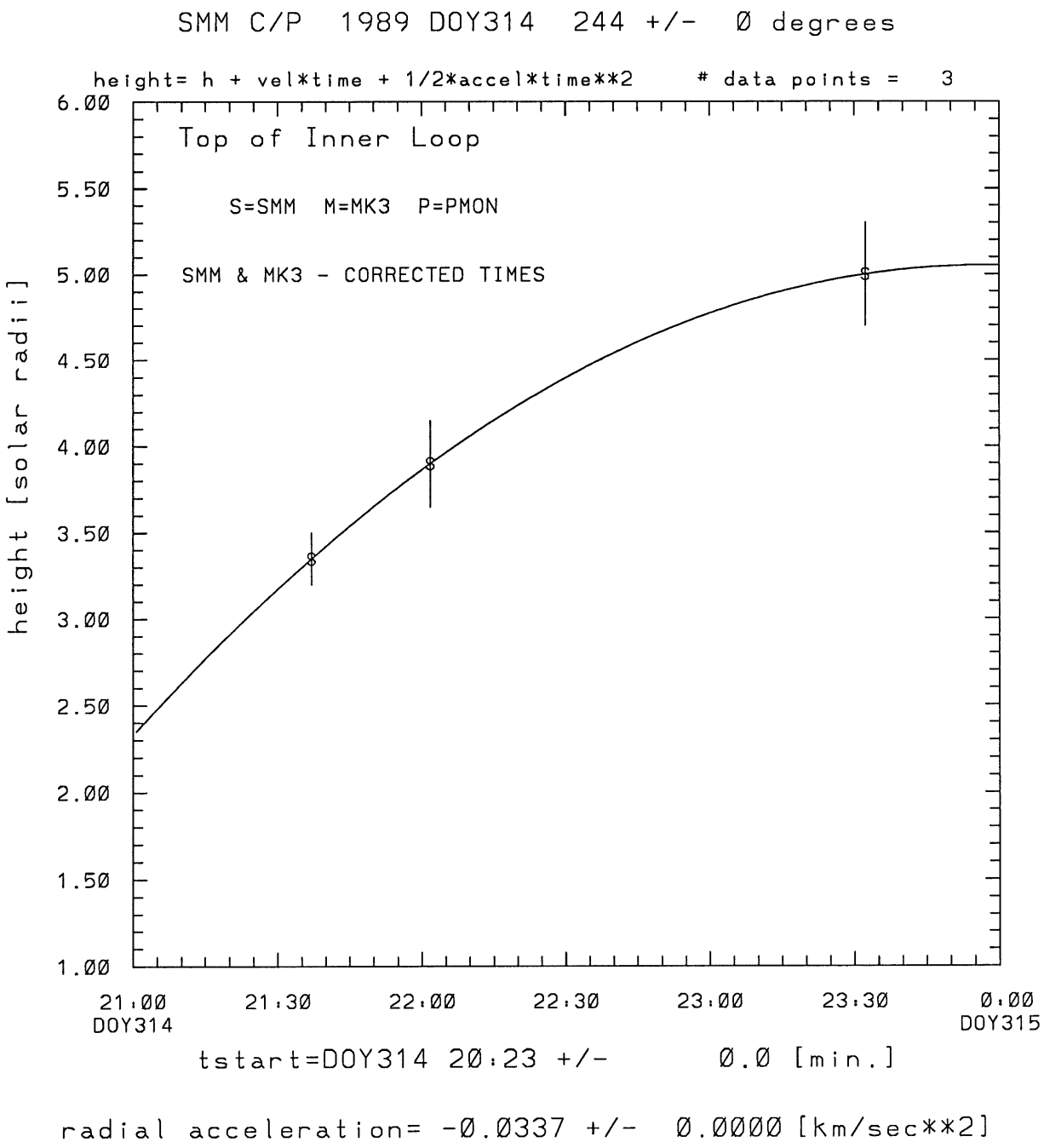
```
**********************
 This is a 1 order run
**********************

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

                                    error in          error in
year doy    time      radii    radius      angle    angle    datatype
1989 314  18:36: 1   2.60 +/- 0.20     244.0 +/-  0.5        SMM
1989 314  19: 0:47   2.80 +/- 0.15     244.0 +/-  0.5        SMM
1989 314  19:17:17   3.00 +/- 0.15     244.0 +/-  1.0        SMM

****************************************
 Structure being measured:
Top of Core
****************************************

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

START TIME:

 Event began at t = 0 + -0.156E+03 +/-  0.887E+01 [minutes]
 In more convenient units:
 Event began at DOY 314 15:54 +/-  0.887E+01 [minutes]

 Origin defined at DOY314 18:30

RADIAL INFORMATION:

RADIAL VELOCITY =   113. +/-    10. km/sec

The computed RADIAL coefficients and errors FROM NLLST2 are:

 c(1) =    0.252E+01 +/-    0.315E-01 [solar radii]
 c(2) =    0.976E-02 +/-    0.891E-03 [radii/min]
 c(2) =    0.113E+03 +/-    0.103E+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)=  0.37112E-01 [radii] see Bevington pg. 114
                   error in c(2)=  0.11329E-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) = 244. +/-   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 RADIAL velocity at 18:36 =  113. km/sec

The RADIAL velocity at 19: 0 =  113. km/sec

The RADIAL velocity at 19:17 =  113. km/sec
```

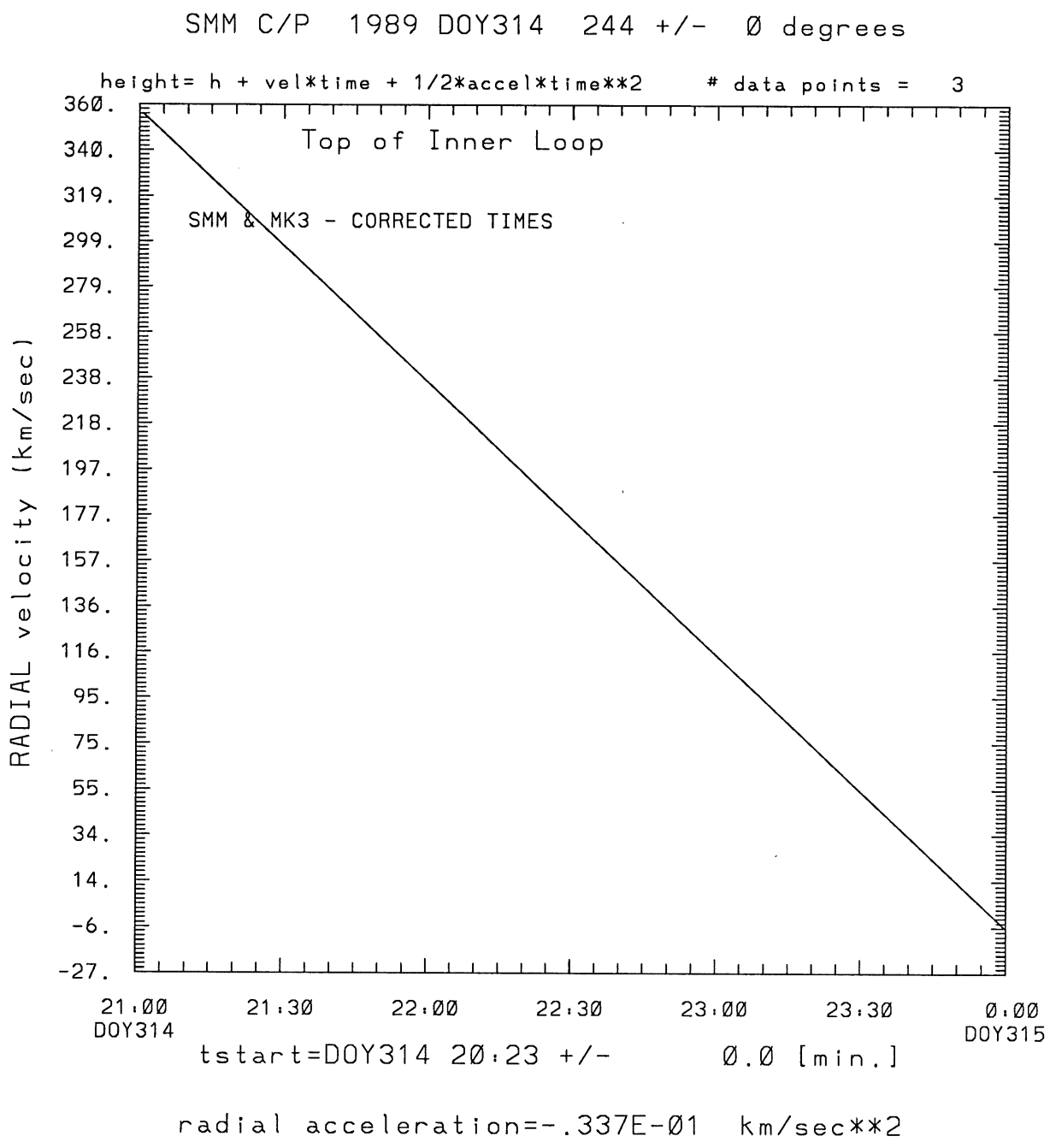
```
**********************************************************
 The following info is for estimating goodness of the fit
**********************************************************

 Fit is ok [ier=1]

 Standard Deviation in the height =  0.20
 Standard Deviation in start time measurement =    0.170E+02
 Error in time =        0.34101E+01 using best fit method
 See Taylor Error Analysis [Univ of Colorado] pg.78

 Value of reduced Chi Squared returned from nllst2 = 0.571E-03
 Reduced Chi Squared = 0.213E-02
 Chi Squared = 0.213E-02
 The probability for exceeding chi square = 0.981E+00

 The correlation coefficient =    0.993E+00
 The probability that no LINEAR correlation exists between the variables =   0.7334
 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
1989 314  18:36: 1   2.60 +/- 0.20    244.0 +/-  0.5        SMM
1989 314  19: 0:47   2.80 +/- 0.15    244.0 +/-  0.5        SMM
1989 314  19:17:17   3.00 +/- 0.15    244.0 +/-  1.0        SMM

****************************************
 Structure being measured:
Top of Core
****************************************

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

START TIME:

 tstart=DOY314 18: 8 from derivative = 0
Event begins at   2.52 Solar Radii
 Origin defined at DOY314 18:30

RADIAL INFORMATION:

RADIAL ACCELERATION =  0.379E-01 +/-  0.267E-06 km/sec**2

The computed RADIAL coefficients and errors FROM NLLST2 are:

 c(1) =    0.257E+01 +/-    0.450E-06 [solar radii]
 c(2) =    0.447E-02 +/-    0.384E-07 [radii/min]
 c(2) =    0.518E+02 +/-    0.445E-03 [km/sec]
 c(3) =    0.980E-04 +/-    0.691E-09 [radii/min**2]
 c(3) =    0.379E-01 +/-    0.267E-06 [km/sec**2]

ANGULAR INFORMATION:

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

The computed ANGULAR coefficients and errors FROM NLLST2 are:

 a(1) = 244. +/-   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 RADIAL velocity at 18:36 =   66. km/sec

The RADIAL velocity at 19: 0 =  122. km/sec

The RADIAL velocity at 19:17 =  159. km/sec


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


 Number data points = number of coefficients.  No error  analysis is possible.
```

Correlation coefficient is not computable!


SMM C/P 1989 DOY314 244 +/- Ø degrees
height = h + velocity*time
# data points = 3
Top of Inner Loop
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
21:00
DOY314
21:30
22:00
22:30
23:00
23:30
0:00
DOY315
tstart=DOY314 18:52 +/- 5.6 [min.]
radial velocity= 166. +/- 16. [km/sec]


SMM C/P 1989 DOY314 244 +/- Ø degrees
height= h + vel*time + 1/2*accel*time**2 # data points = 3
Top of Inner Loop
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
21:00 DOY314
21:30
22:00
22:30
23:00
23:30
0:00 DOY315
tstart=DOY314 20:23 +/- Ø.Ø [min.]
radial acceleration= -Ø.Ø337 +/- Ø.ØØØØ [km/sec**2]


SMM C/P 1989 DOY314 244 +/- Ø degrees
height= h + vel*time + 1/2*accel*time**2 # data points = 3
Top of Inner Loop
SMM & MK3 - CORRECTED TIMES
RADIAL velocity (km/sec)
360.
340.
319.
299.
279.
258.
238.
218.
197.
177.
157.
136.
116.
95.
75.
55.
34.
14.
-6.
-27.
21:ØØ
DOY314
21:3Ø
22:ØØ
22:3Ø
23:ØØ
23:3Ø
Ø:ØØ
DOY315
tstart=DOY314 2Ø:23 +/- Ø.Ø [min.]
radial acceleration=-.337E-Ø1 km/sec**2

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

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

                                   error in          error in
year doy    time      radii   radius      angle    angle    datatype
1989 314   21:37: 2   3.35 +/- 0.15     244.0 +/-  1.0        SMM
1989 314   22: 1:48   3.90 +/- 0.25     244.0 +/-  1.0        SMM
1989 314   23:32:18   5.00 +/- 0.30     244.0 +/-  1.0        SMM

****************************************
 Structure being measured:
Top of Inner Loop
****************************************

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

START TIME:

 Event began at t = 0 + -0.130E+03 +/-  0.561E+01 [minutes]
 In more convenient units:
 Event began at DOY 314 18:52 +/-  0.561E+01 [minutes]

 Origin defined at DOY314 21: 0

RADIAL INFORMATION:

RADIAL VELOCITY =   166. +/-    16. km/sec

The computed RADIAL coefficients and errors FROM NLLST2 are:

 c(1) =    0.286E+01 +/-    0.103E+00 [solar radii]
 c(2) =    0.143E-01 +/-    0.142E-02 [radii/min]
 c(2) =    0.166E+03 +/-    0.164E+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)=  0.18648E+00 [radii] see Bevington pg. 114
                    error in c(2)=  0.19171E-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) = 244. +/-   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 RADIAL velocity at 21:37 =  166. km/sec

The RADIAL velocity at 22: 1 =  166. km/sec

The RADIAL velocity at 23:32 =  166. km/sec
```

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

 Fit is ok [ier=1]

 Standard Deviation in the height =  0.84
 Standard Deviation in start time measurement =    0.495E+02
 Error in time =        0.11464E+02 using best fit method
 See Taylor Error Analysis [Univ of Colorado] pg.78

 Value of reduced Chi Squared returned from nllst2 = 0.995E-02
 Reduced Chi Squared = 0.545E-01
 Chi Squared = 0.545E-01
 The probability for exceeding chi square = 0.921E+00

 The correlation coefficient =    0.992E+00
 The probability that no LINEAR correlation exists between the variables =   0.8145
 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
1989 314  21:37: 2   3.35 +/- 0.15    244.0 +/-  1.0        SMM
1989 314  22: 1:48   3.90 +/- 0.25    244.0 +/-  1.0        SMM
1989 314  23:32:18   5.00 +/- 0.30    244.0 +/-  1.0        SMM

****************************************
 Structure being measured:
Top of Inner Loop
****************************************

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

START TIME:

 Event began at t = 0 + -0.388E+02 +/-  0.000E+00 [minutes]
 In more convenient units:
 Event began at DOY 314 20:23 +/-  0.000E+00 [minutes]

 Origin defined at DOY314 21: 0

RADIAL INFORMATION:

RADIAL ACCELERATION = -0.337E-01 +/-  0.127E-06 km/sec**2

The computed RADIAL coefficients and errors FROM NLLST2 are:

 c(1) =    0.233E+01 +/-    0.209E-05 [solar radii]
 c(2) =    0.308E-01 +/-    0.627E-07 [radii/min]
 c(2) =    0.358E+03 +/-    0.728E-03 [km/sec]
 c(3) =   -0.872E-04 +/-    0.330E-09 [radii/min**2]
 c(3) =   -0.337E-01 +/-    0.127E-06 [km/sec**2]

ANGULAR INFORMATION:

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

The computed ANGULAR coefficients and errors FROM NLLST2 are:

 a(1) = 244. +/-   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 RADIAL velocity at 21:37 =  283. km/sec

The RADIAL velocity at 22: 1 =  233. km/sec

The RADIAL velocity at 23:32 =   49. km/sec


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

Number data points = number of coefficients. No error analysis is possible.

Correlation coefficient is not computable!