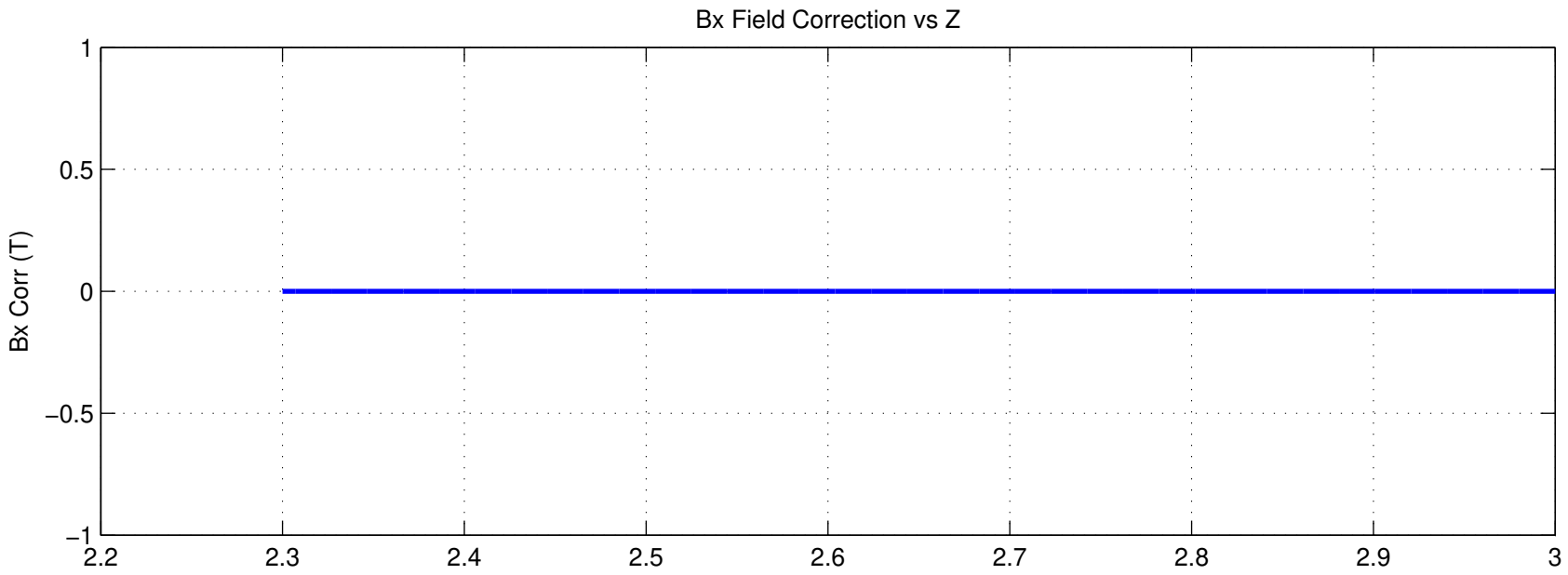
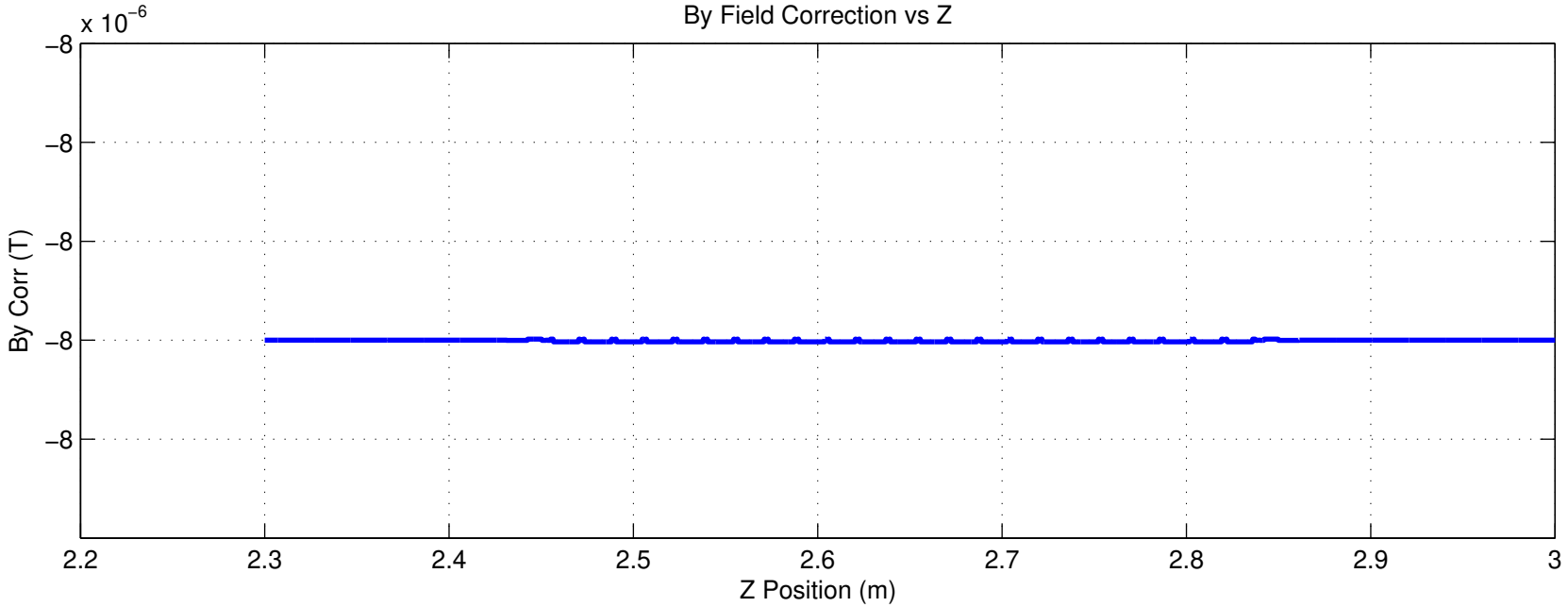
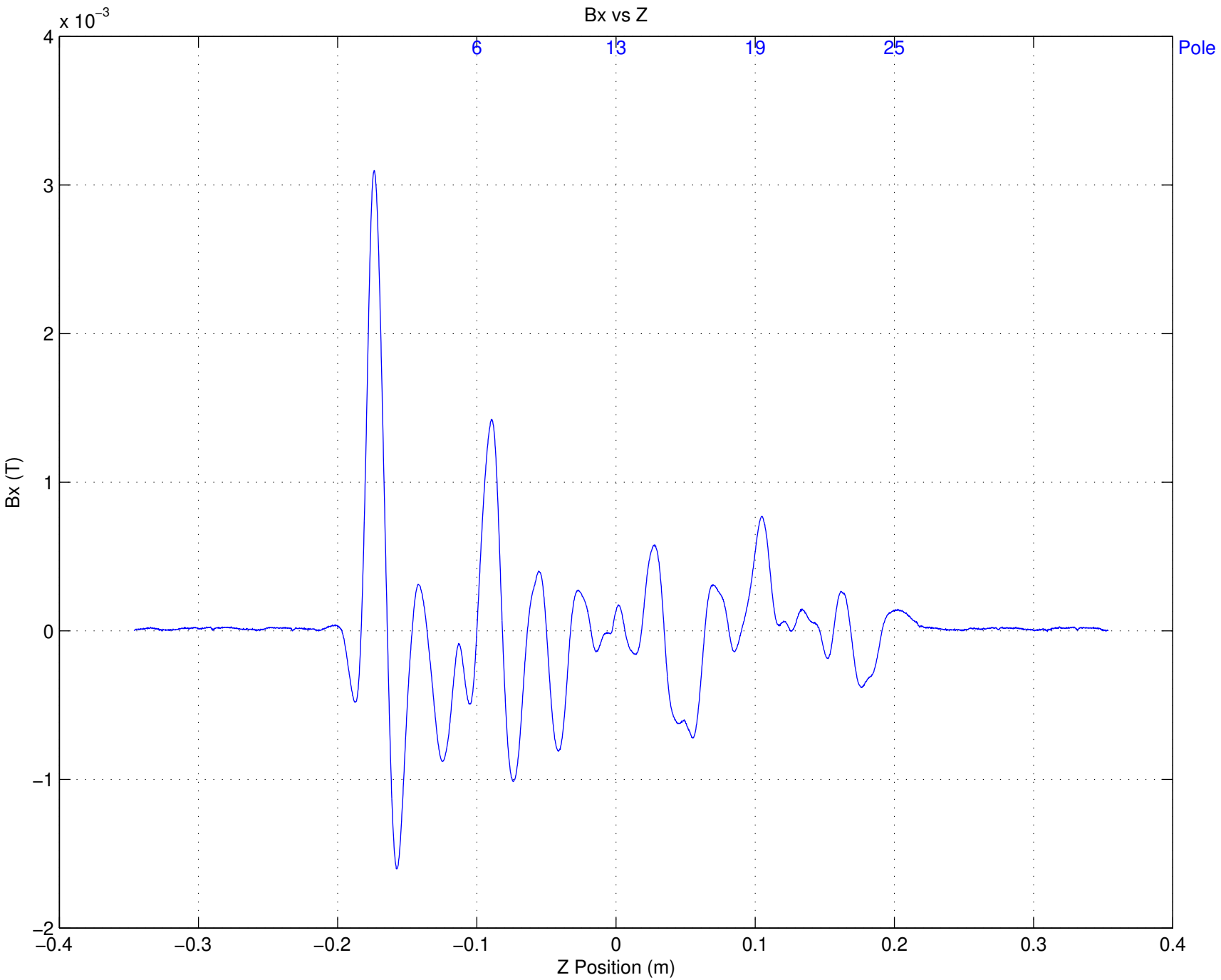
SLAC Magnetic Measurements

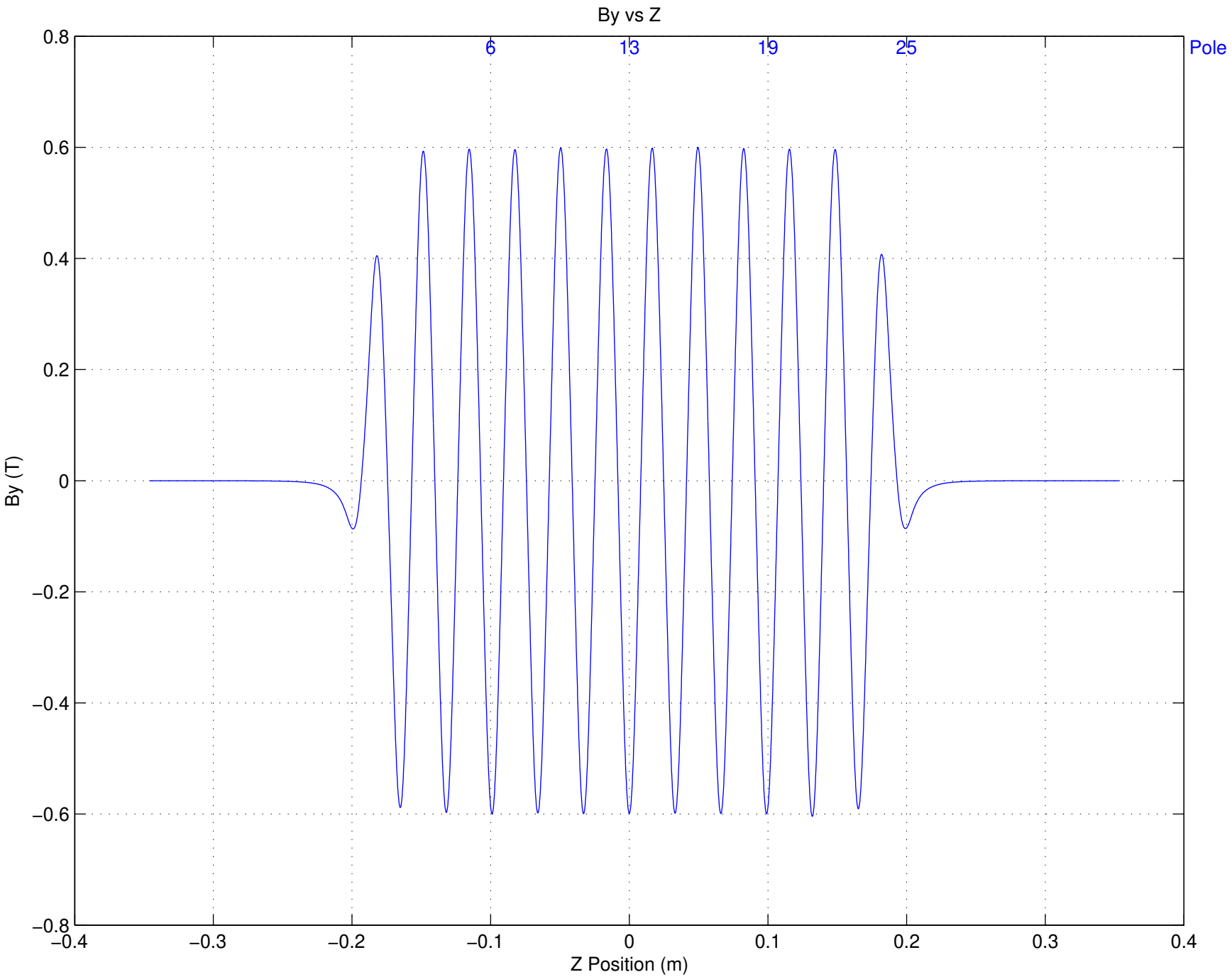
Planar Insertion Device Analysis

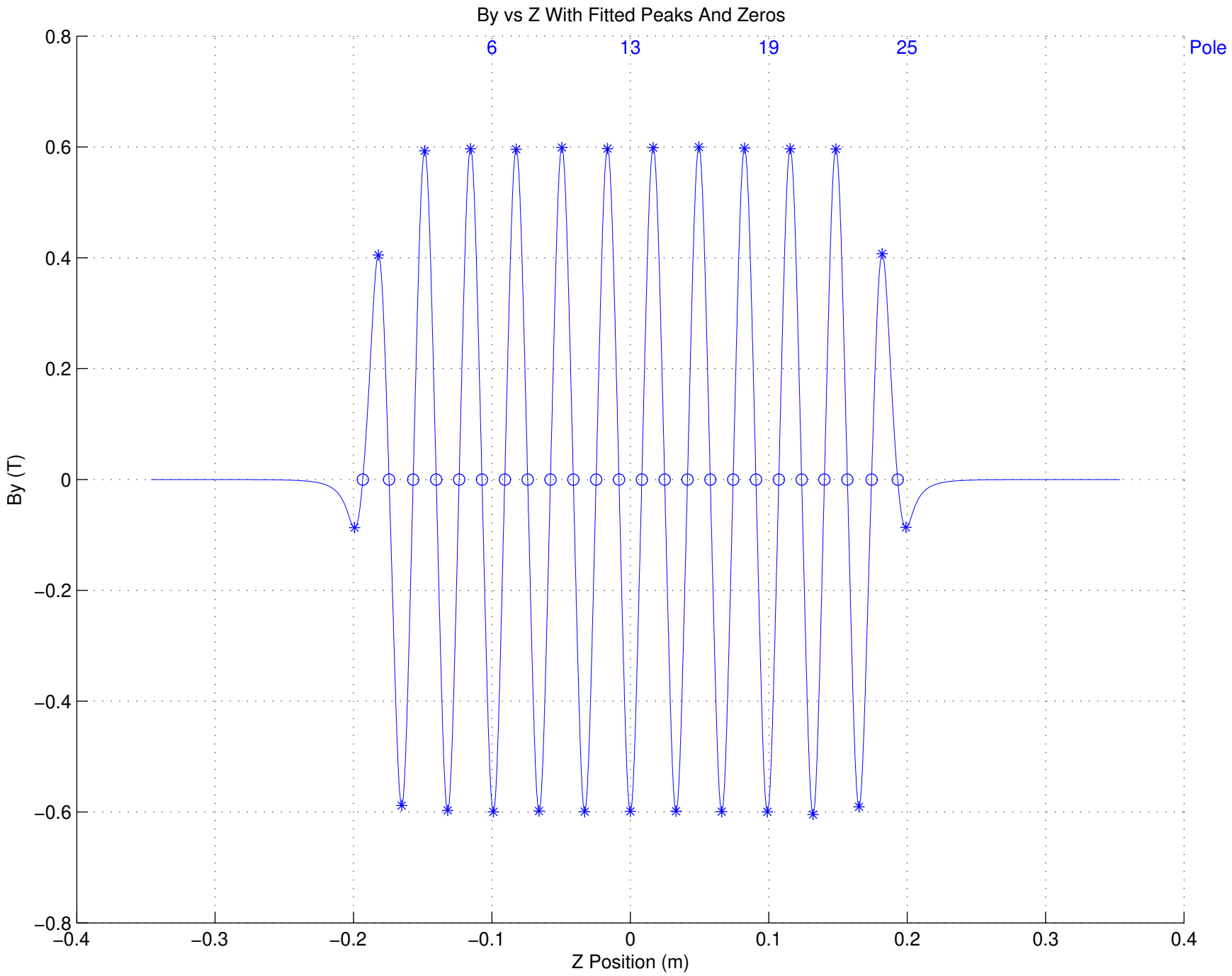
Parameters:
INPUT−FILE−DIR =S:\MagData\LCLS\Undulator\ECKO7−33\DATASET0002\Fine Tuning\Z Scans\Run 014\
INPUT−FILE−NAME =x+00000−y+000−bscanz.dat
INPUT−FILE−TYPE =ZVXYBXYH
CORR−REQUIRED =1
GAMMA =233.3175
NOM−LAMBDA−U =0.033
NOM−K−VALUE =1.8016
NOM−LAMBDA−R =7.95e−007
NUM−POLES =25
NUM−END−POLES =4
CELL−LENGTH =0.2805

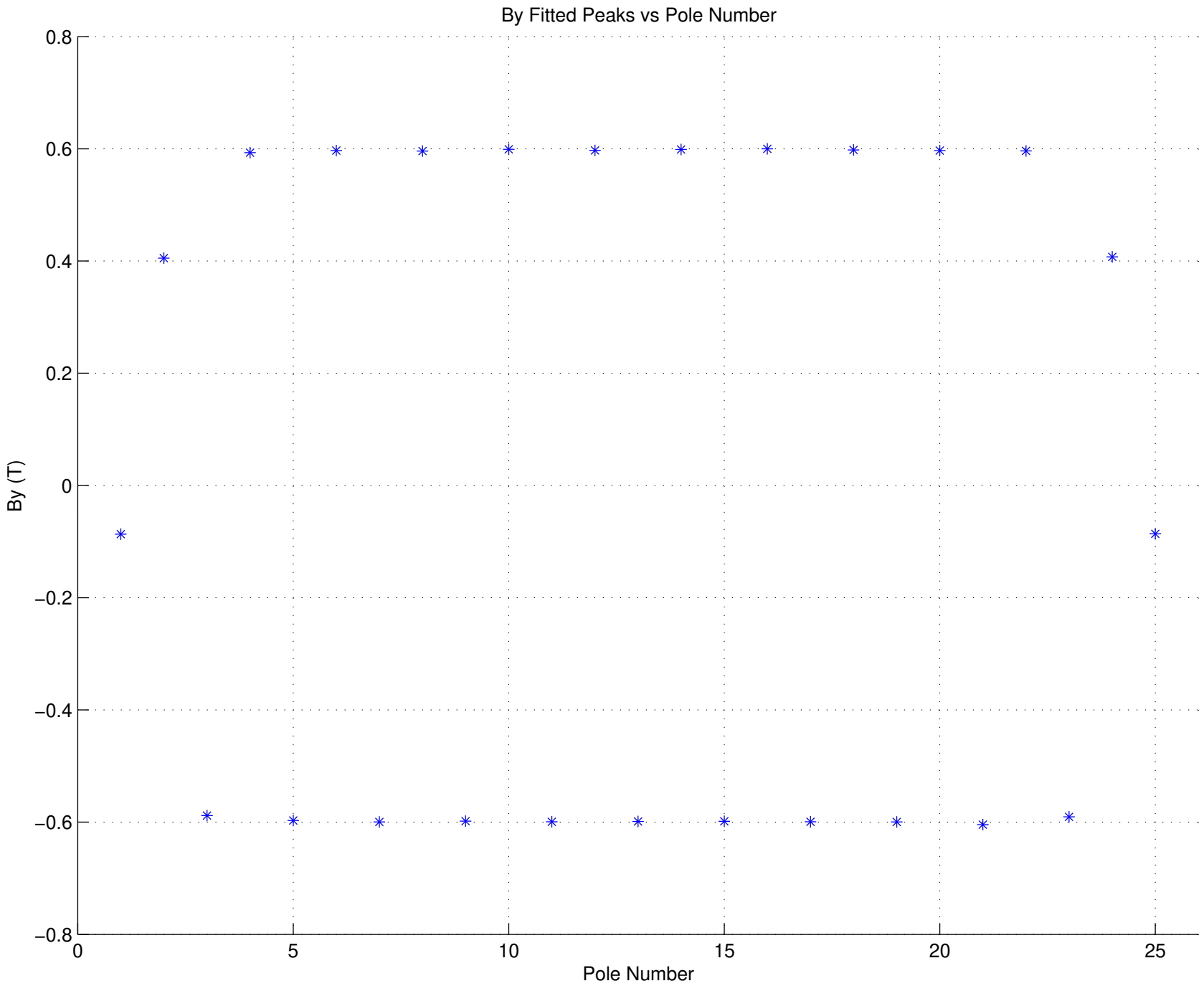

Bx Field Correction vs Z
Bx Corr (T)
1
0.5
0
−0.5
−1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3

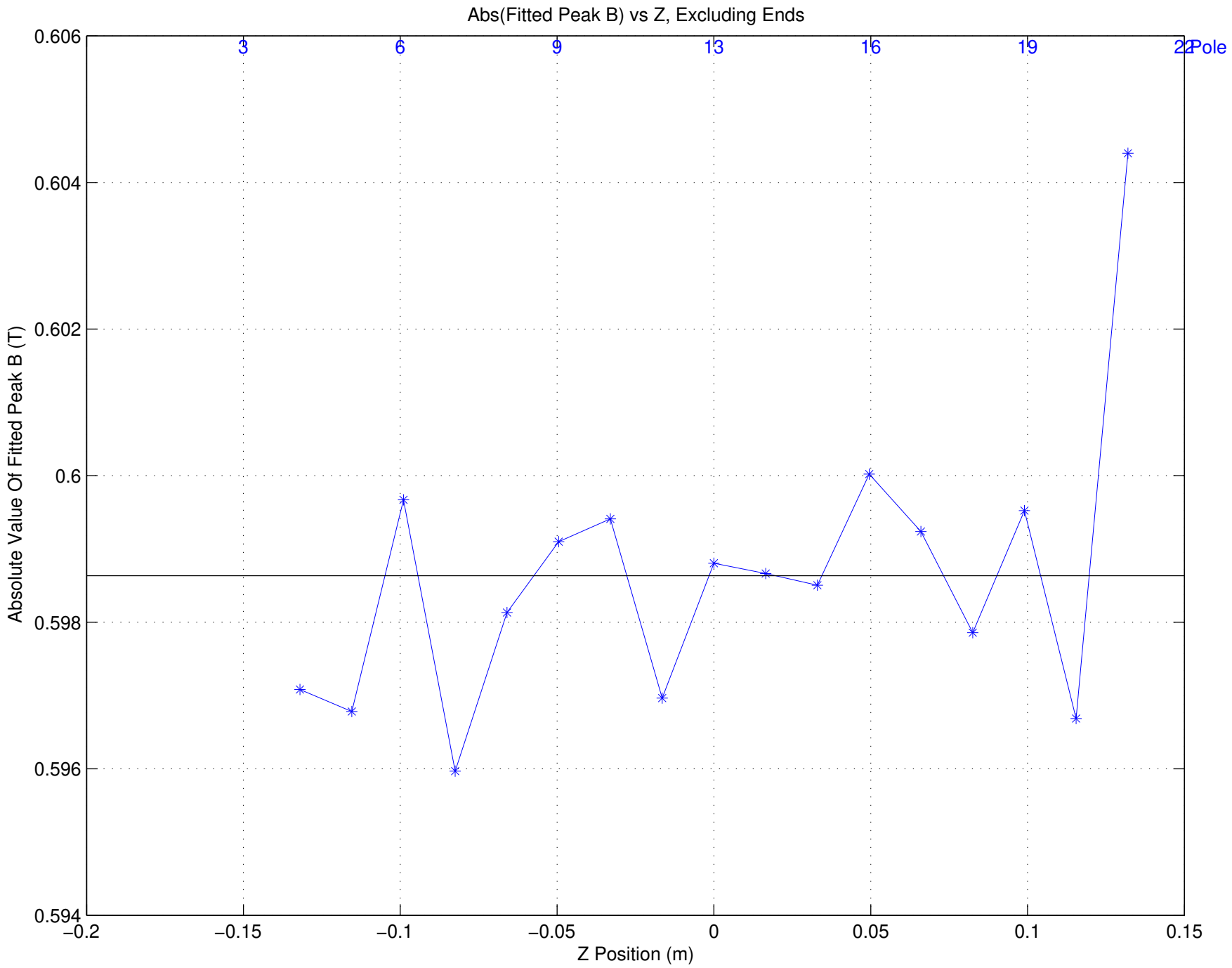

By Field Correction vs Z
x 10^−6
By Corr (T)
−8
−8
−8
−8
−8
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3
Z Position (m)


Bx vs Z
x 10^-3
4
3
2
1
0
−1
−2
6
13
19
25
Pole
Bx (T)
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z Position (m)

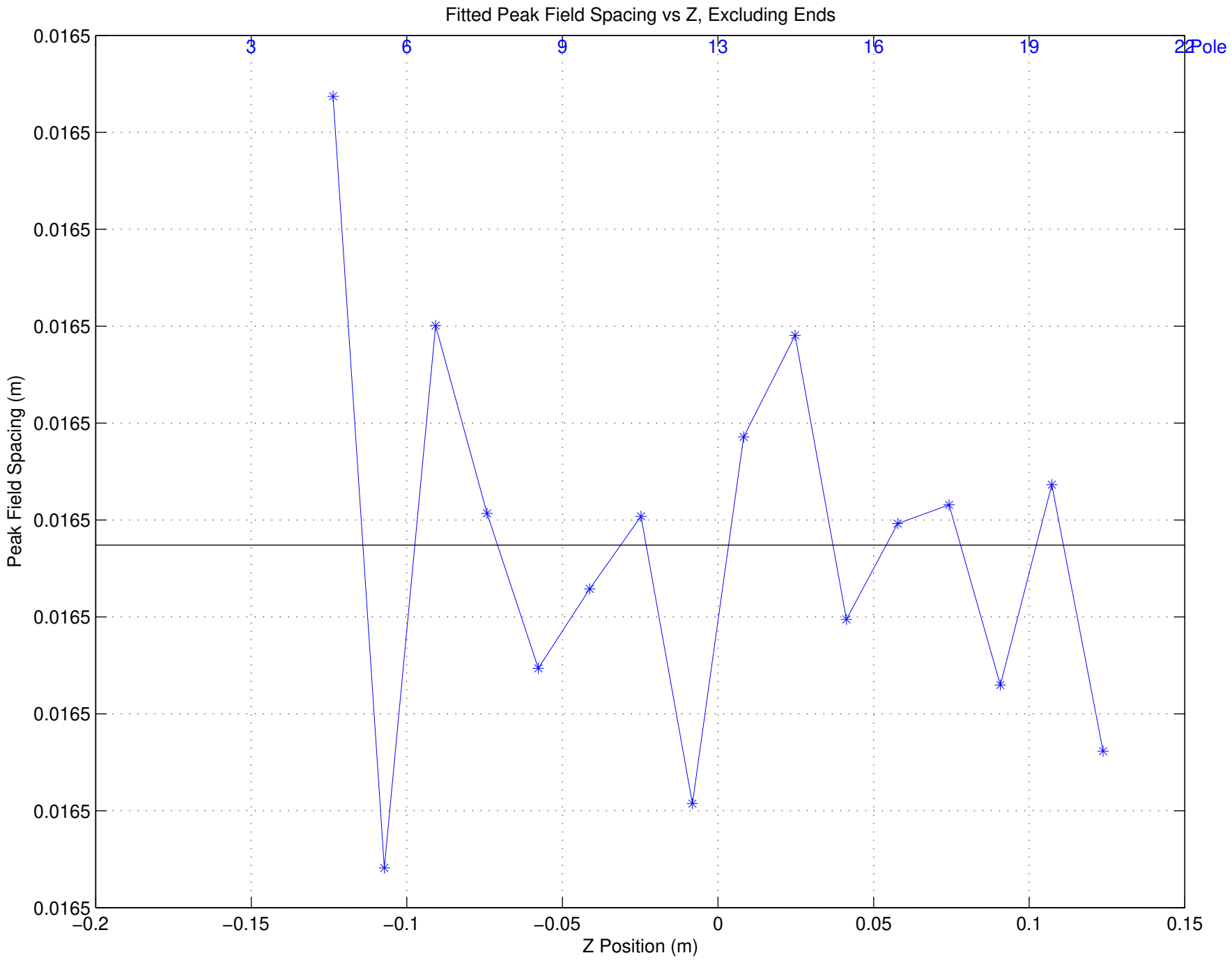

By vs Z
6
13
19
25
Pole
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
By (T)
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z Position (m)


By vs Z With Fitted Peaks And Zeros
6
13
19
25
Pole
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
By (T)
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z Position (m)

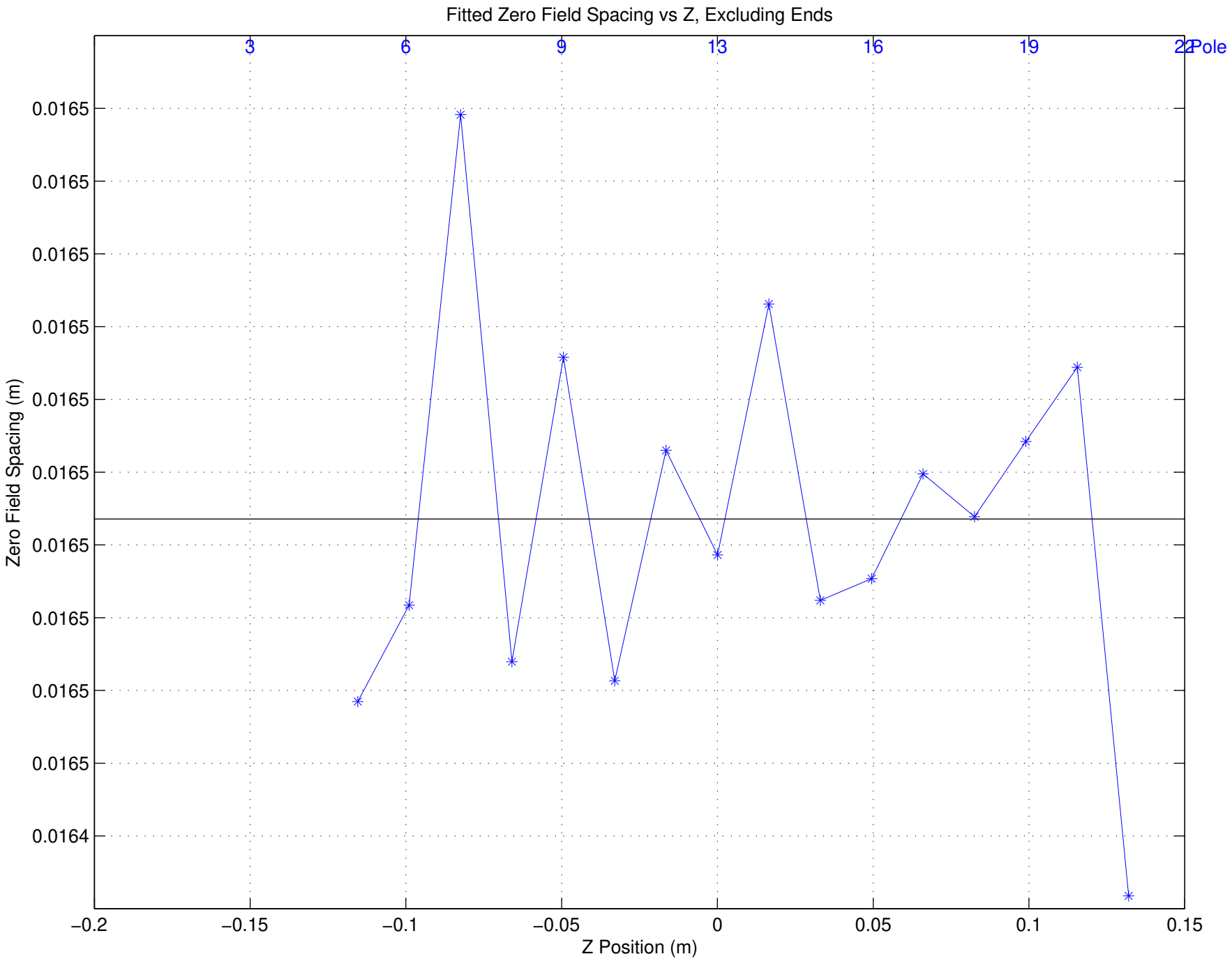

By Fitted Peaks vs Pole Number
By (T)
Pole Number
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
0
5
10
15
20
25



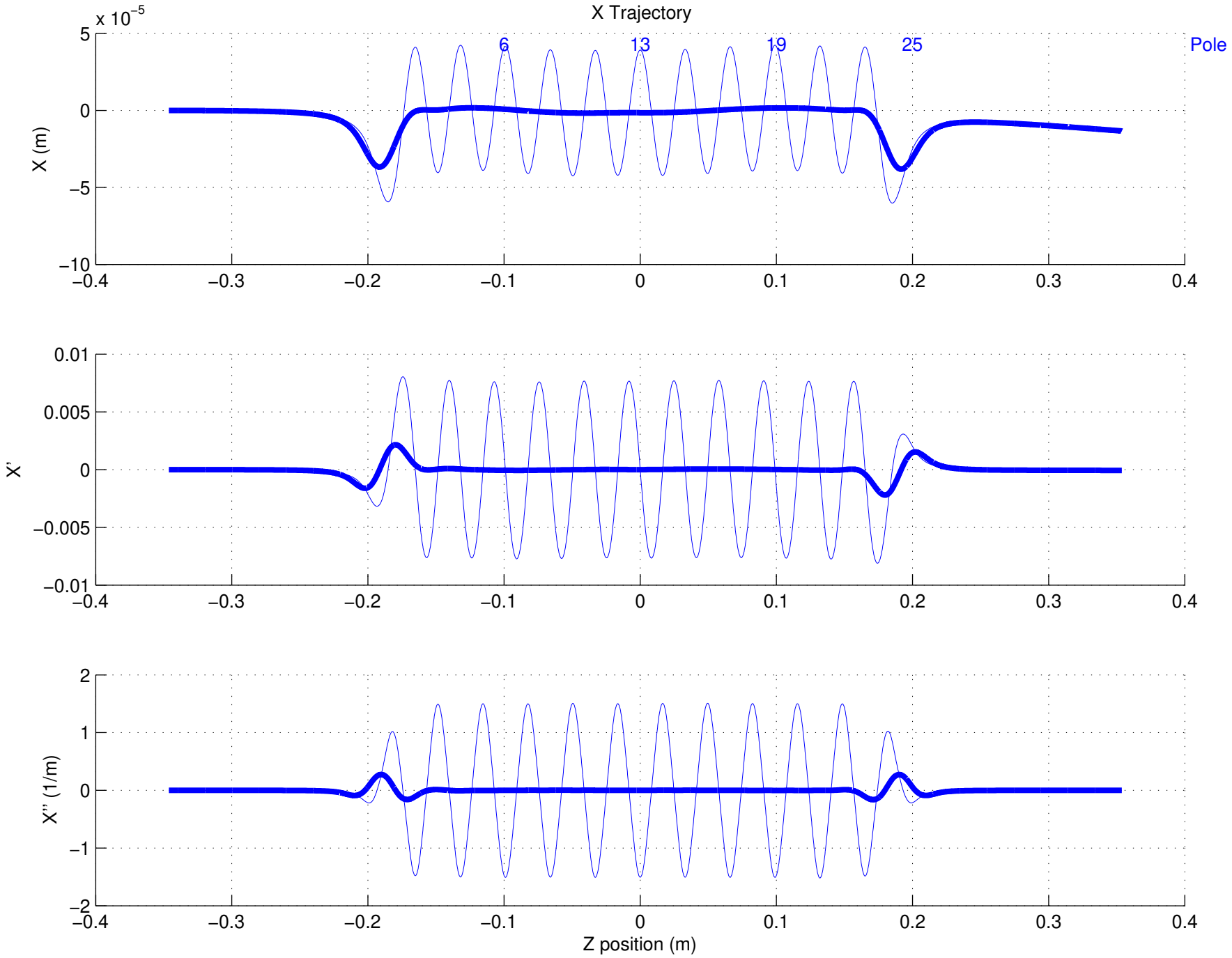
Peak Fields: Ave = 0.598635 T, RMS = 0.001914 T

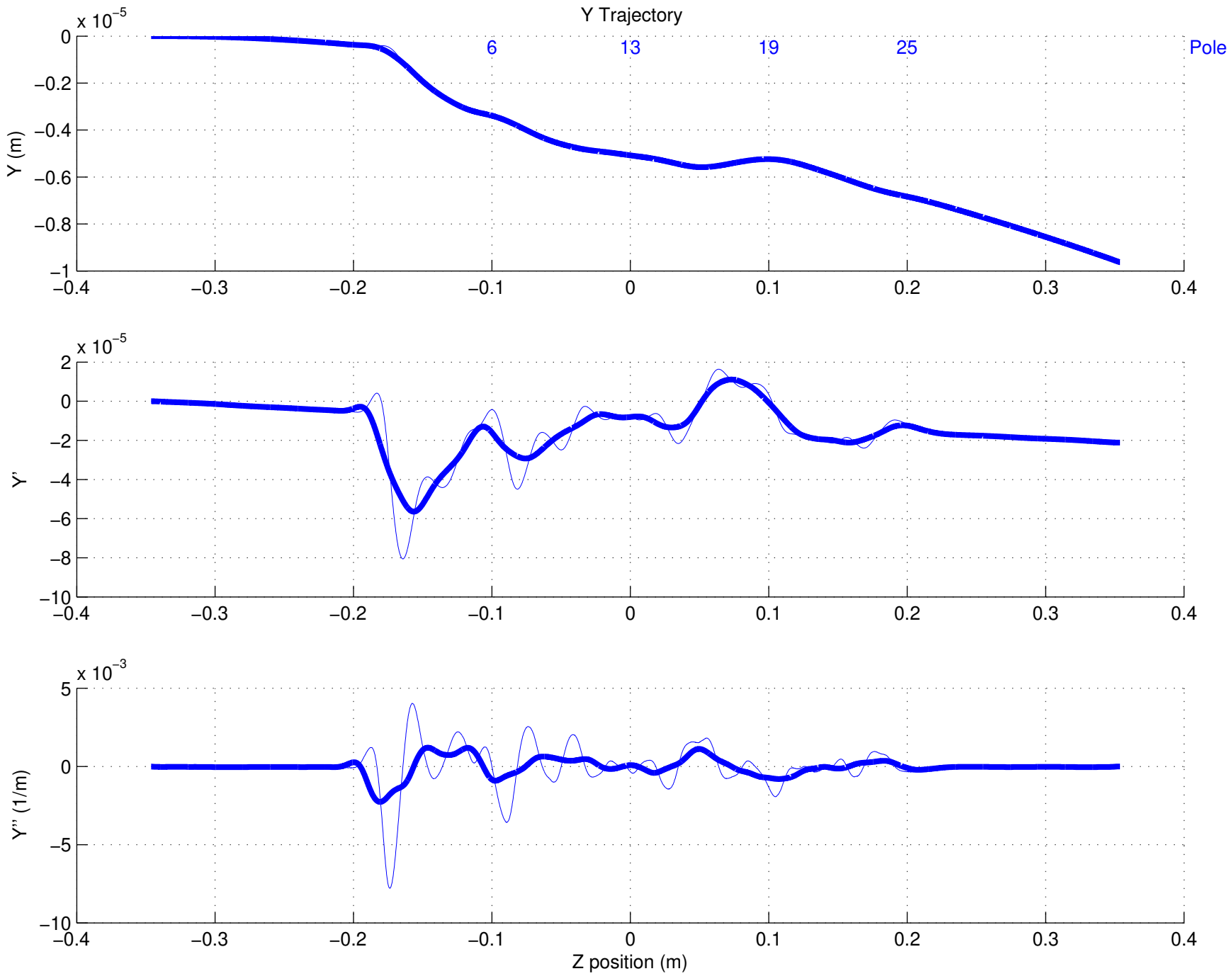


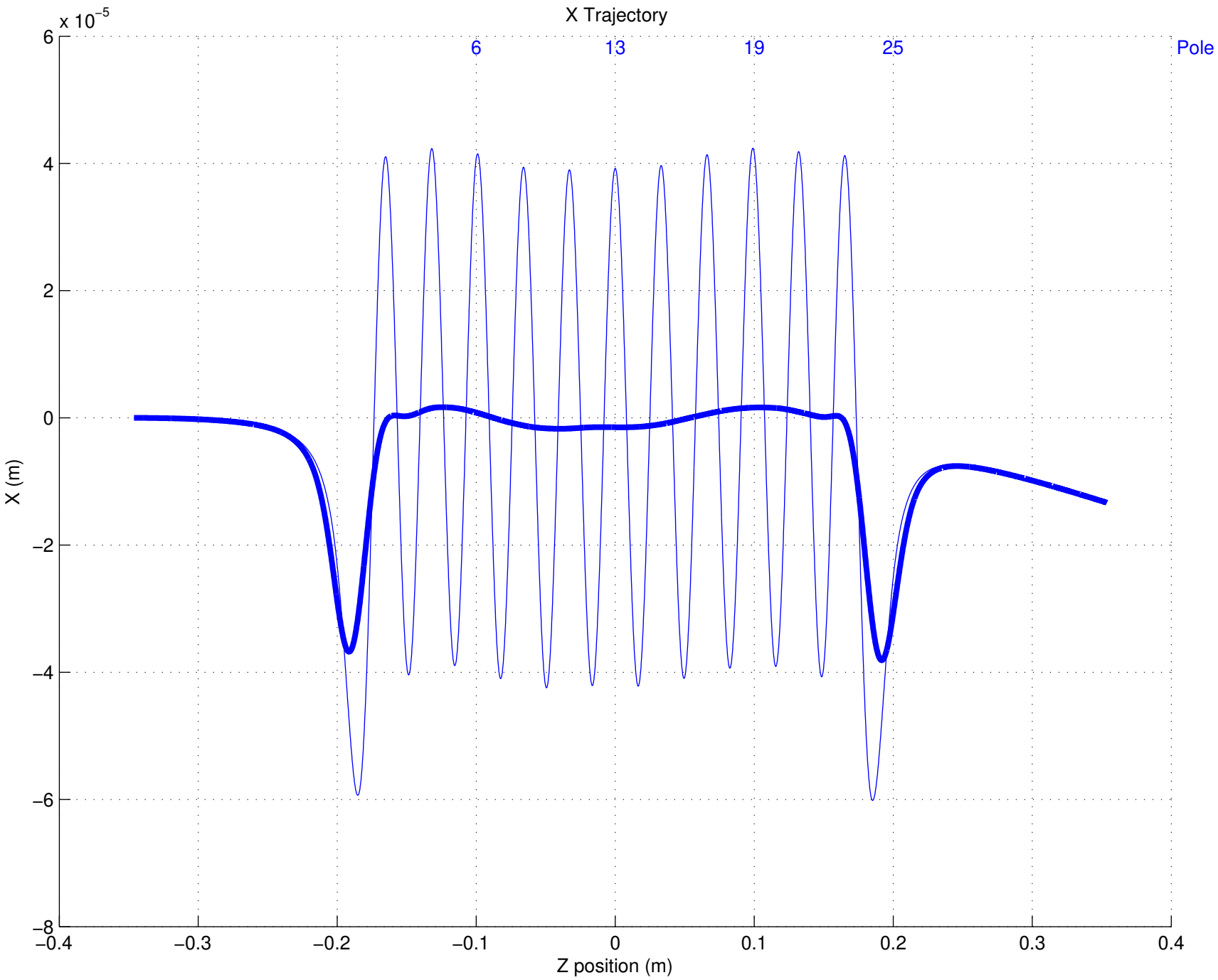
Peak Field Spacing: Ave = 0.016499 m, RMS = 0.000010 m

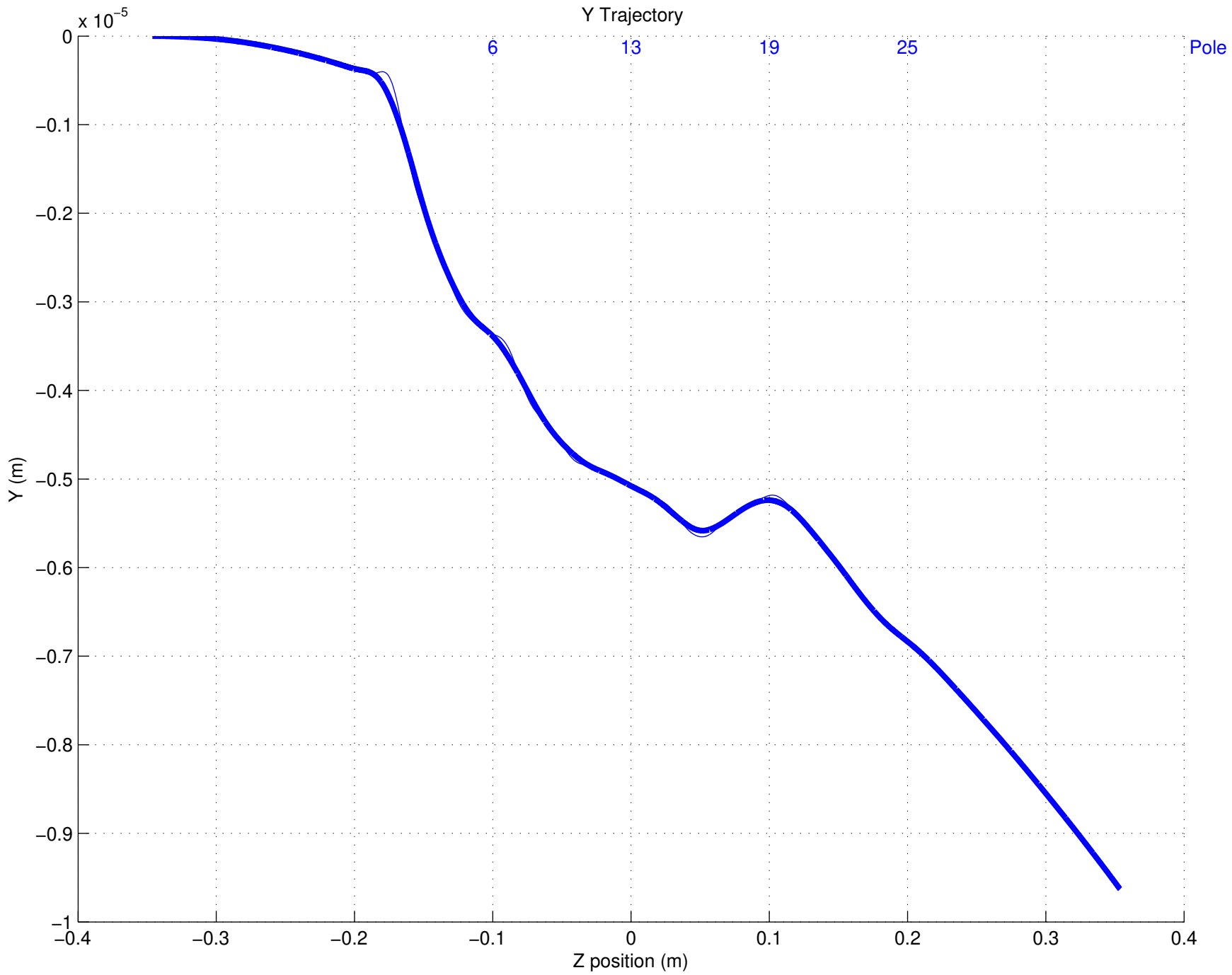


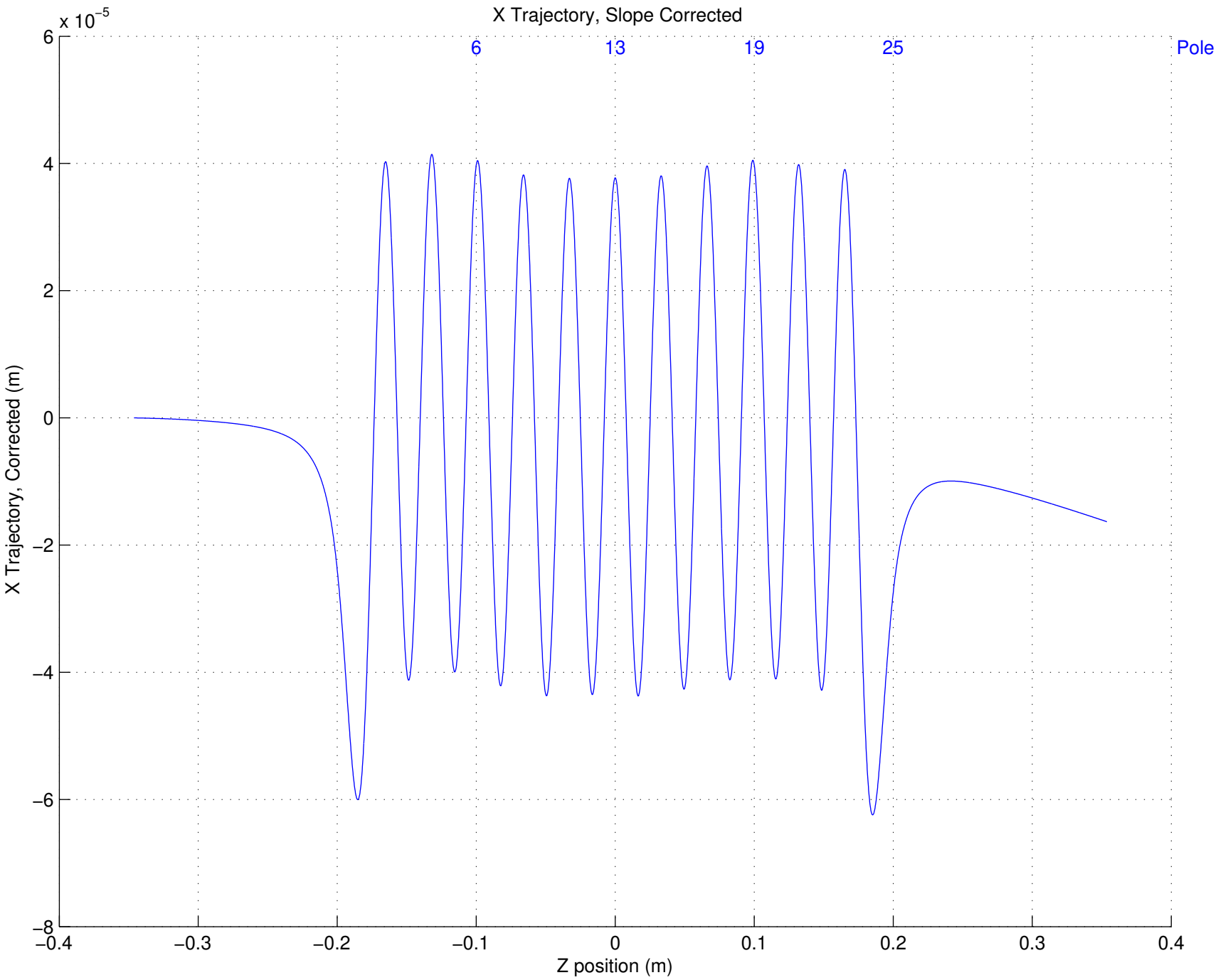
Zero Field Spacing: Ave = 0.016494 m, RMS = 0.000025 m

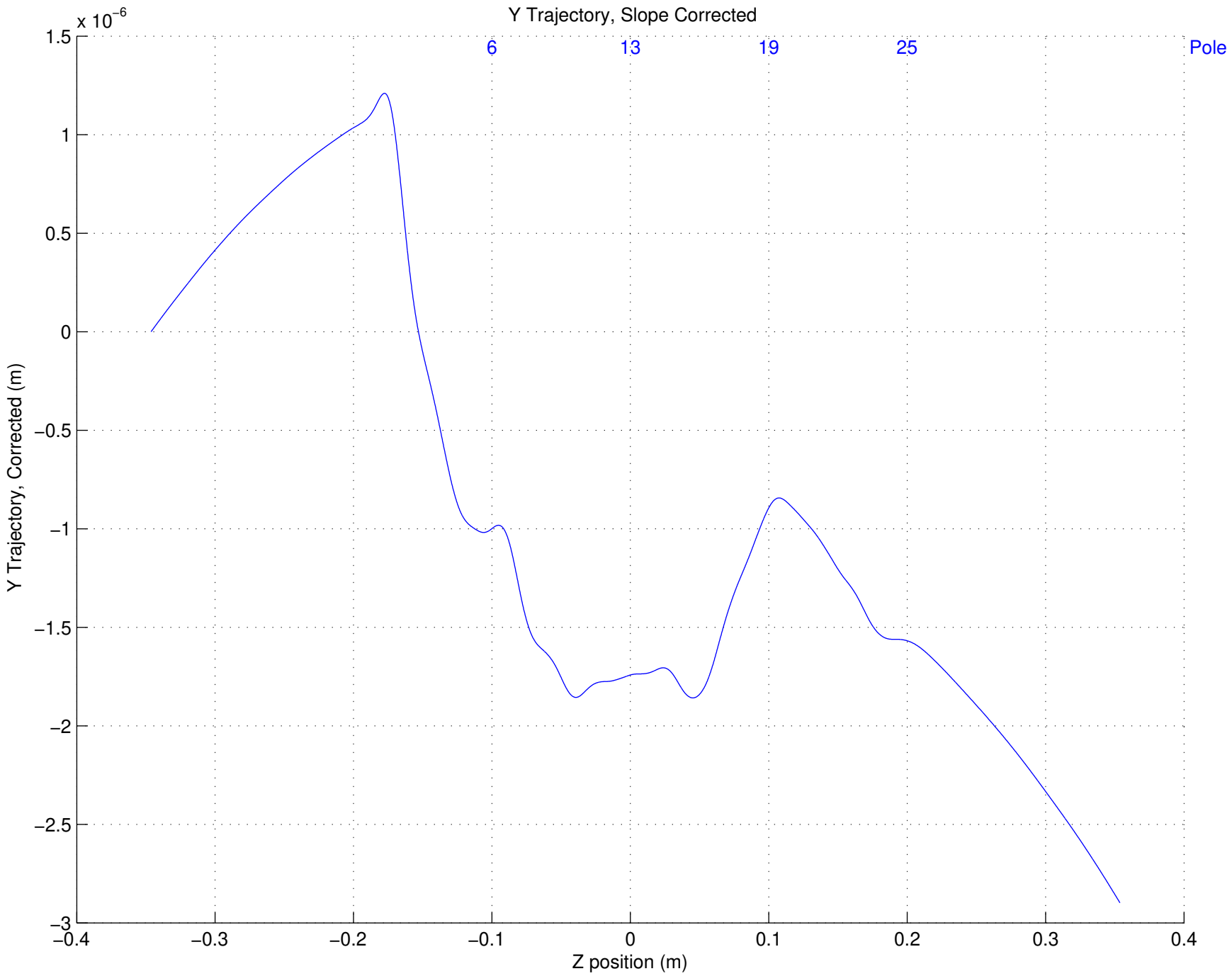

X Trajectory
x 10^-5
6
13
19
25
Pole
X (m)
X'
X'' (1/m)
Z position (m)

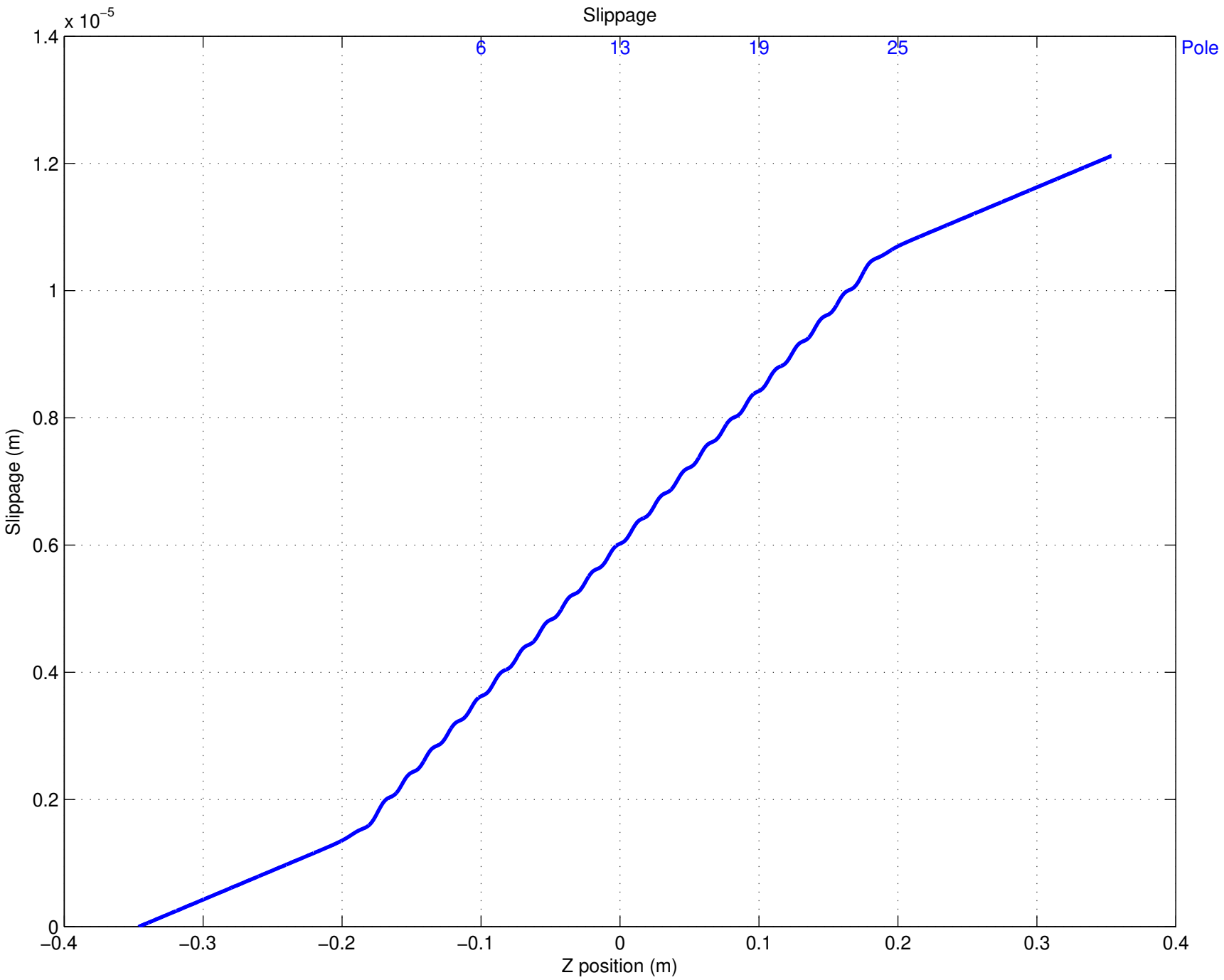

Y Trajectory
x 10^-5
6
13
19
25
Pole
Y (m)
0
−0.2
−0.4
−0.6
−0.8
−1
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
x 10^-5
Y'
2
0
−2
−4
−6
−8
−10
x 10^-3
Y'' (1/m)
5
0
−5
−10
Z position (m)

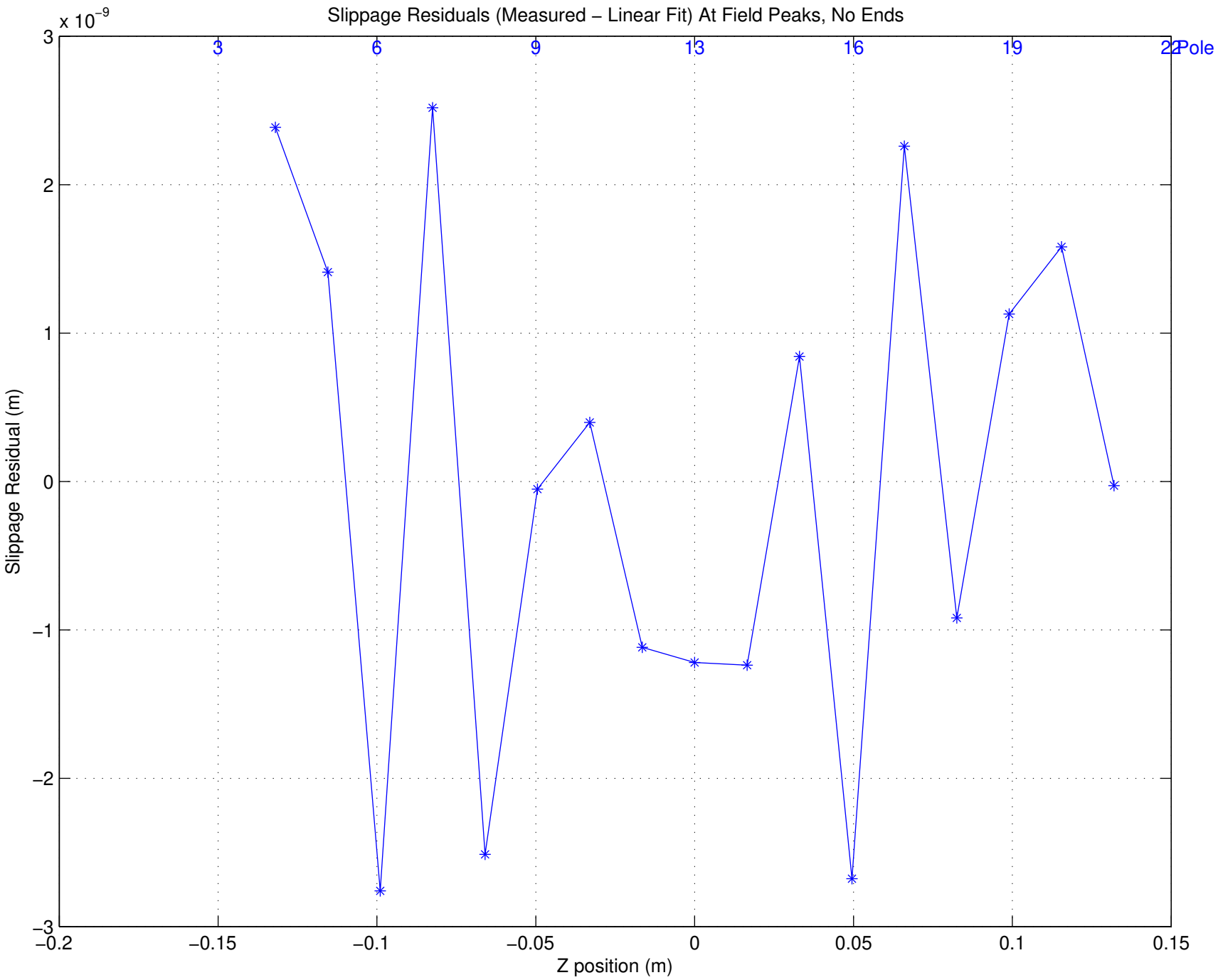

X Trajectory
x 10^-5
6
4
2
0
−2
−4
−6
−8
X (m)
6
13
19
25
Pole
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z position (m)

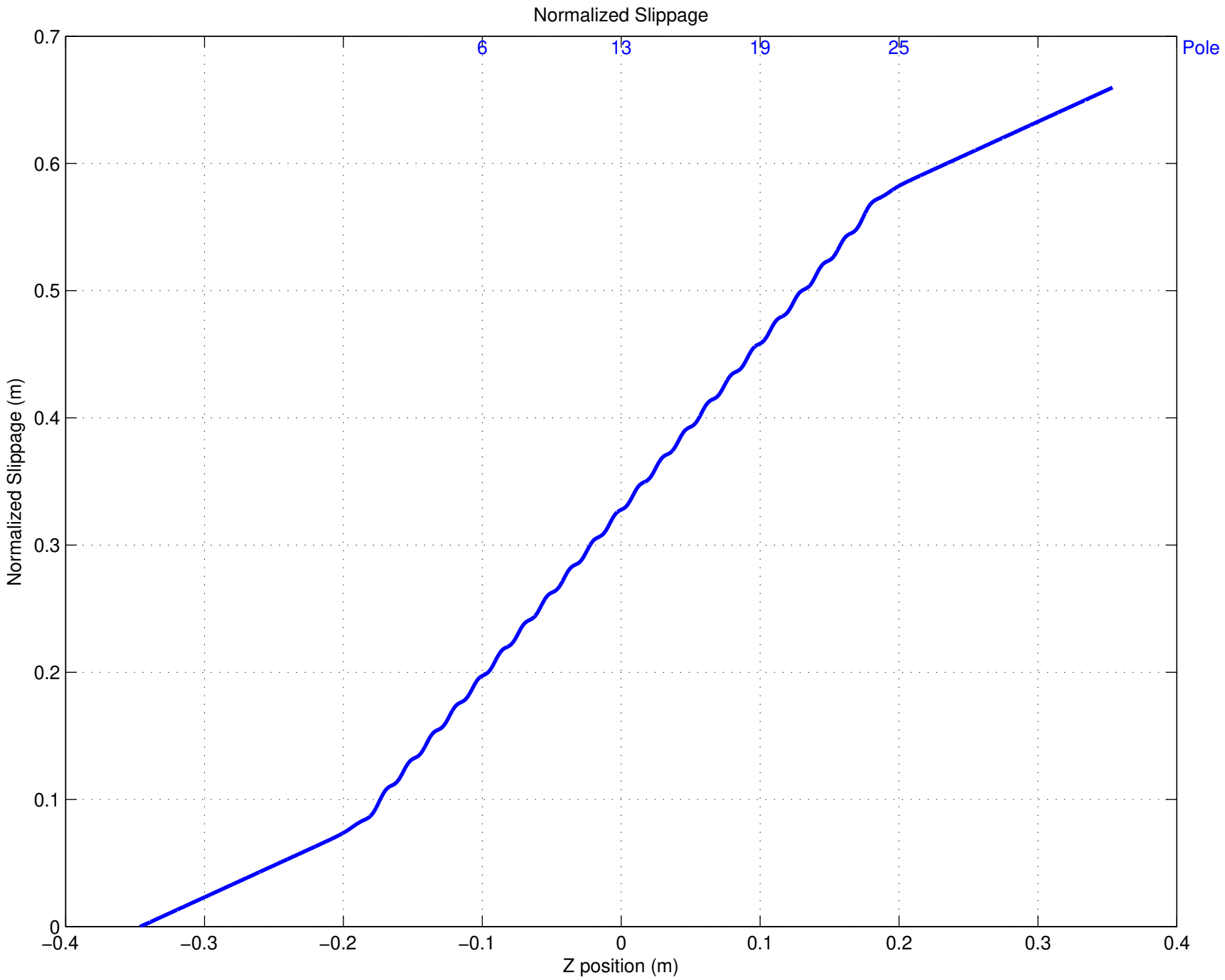

Y Trajectory
x 10^-5
0
−0.1
−0.2
−0.3
−0.4
−0.5
−0.6
−0.7
−0.8
−0.9
−1
Y (m)
6
13
19
25
Pole
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z position (m)

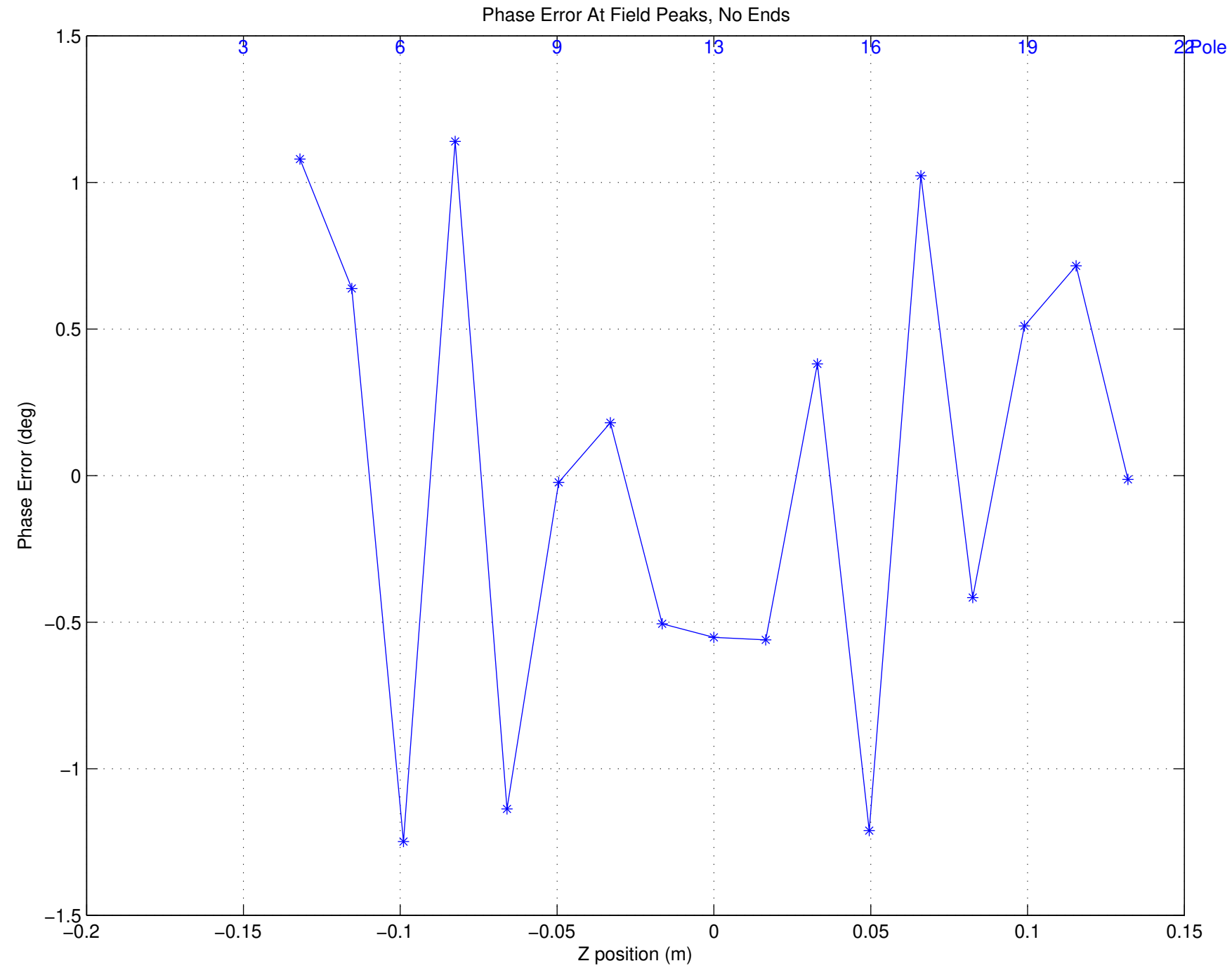

X Trajectory, Slope Corrected
x 10^-5
6
4
2
0
−2
−4
−6
−8
6
13
19
25
Pole
X Trajectory, Corrected (m)
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z position (m)


Y Trajectory, Slope Corrected
x 10^-6
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
−3
6
13
19
25
Pole
Y Trajectory, Corrected (m)
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z position (m)

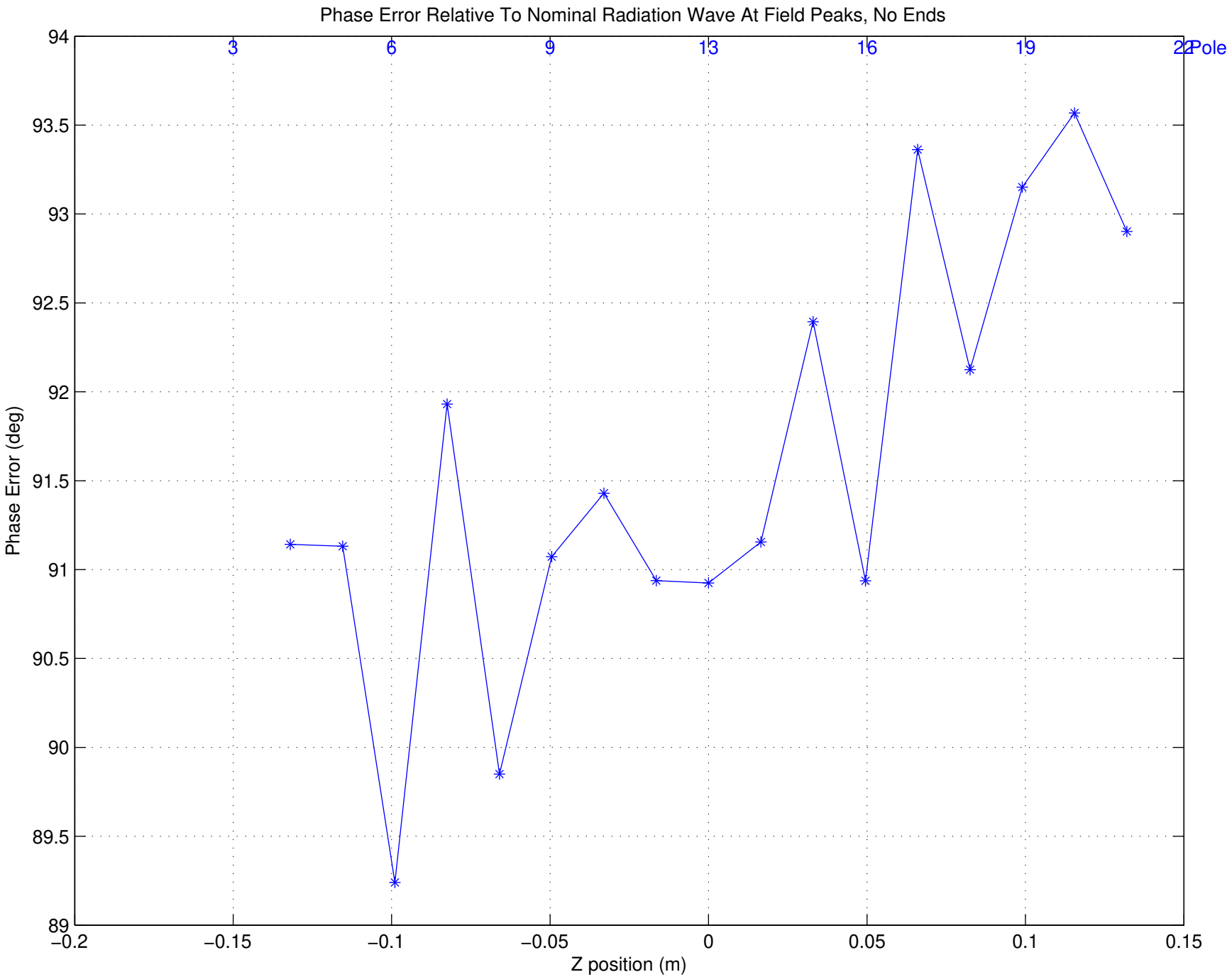

Slippage
x 10^-5
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Slippage (m)
6
13
19
25
Pole
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z position (m)


Slippage Residuals (Measured – Linear Fit) At Field Peaks, No Ends
x 10^-9
3
2
1
0
−1
−2
−3
Slippage Residual (m)
3
6
9
13
16
19
22
Pole
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
Z position (m)


Normalized Slippage
6
13
19
25
Pole
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Normalized Slippage (m)
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z position (m)



Phase Error: Ave = −0.000000 deg, RMS = 0.799731 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
3
6
9
13
16
19
22
Pole
94
93.5
93
92.5
92
91.5
91
90.5
90
89.5
89
Phase Error (deg)
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
Z position (m)