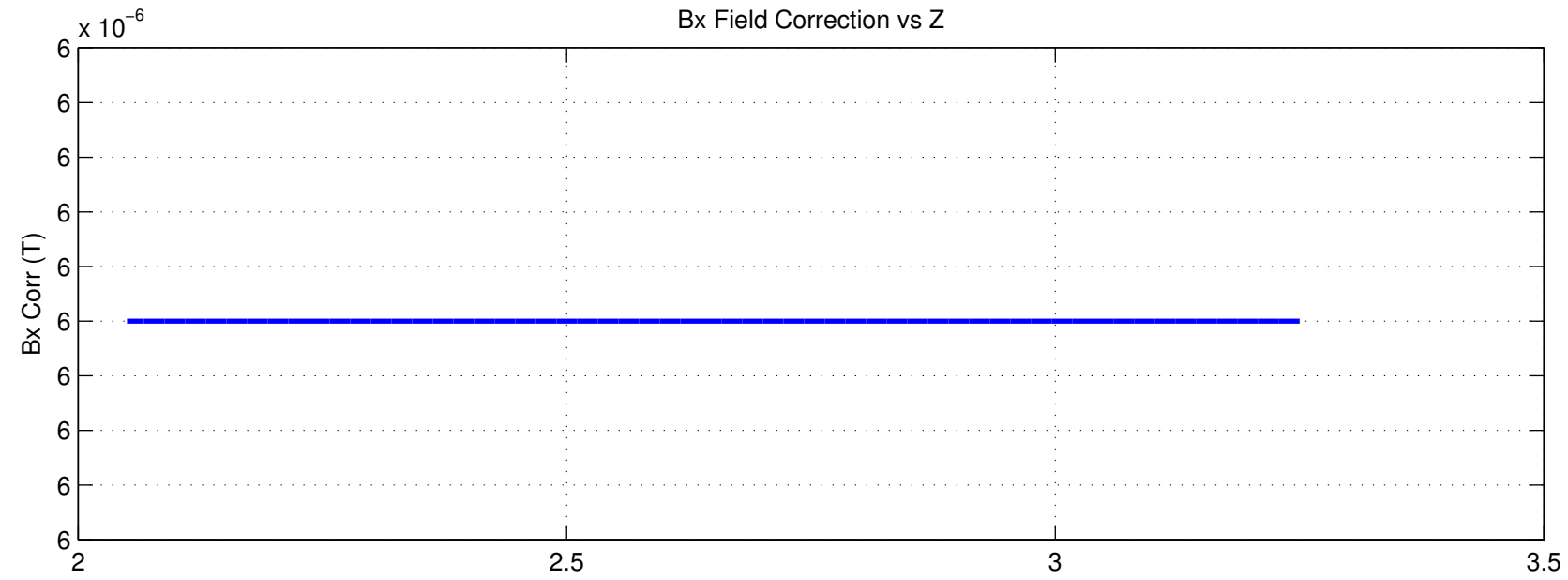
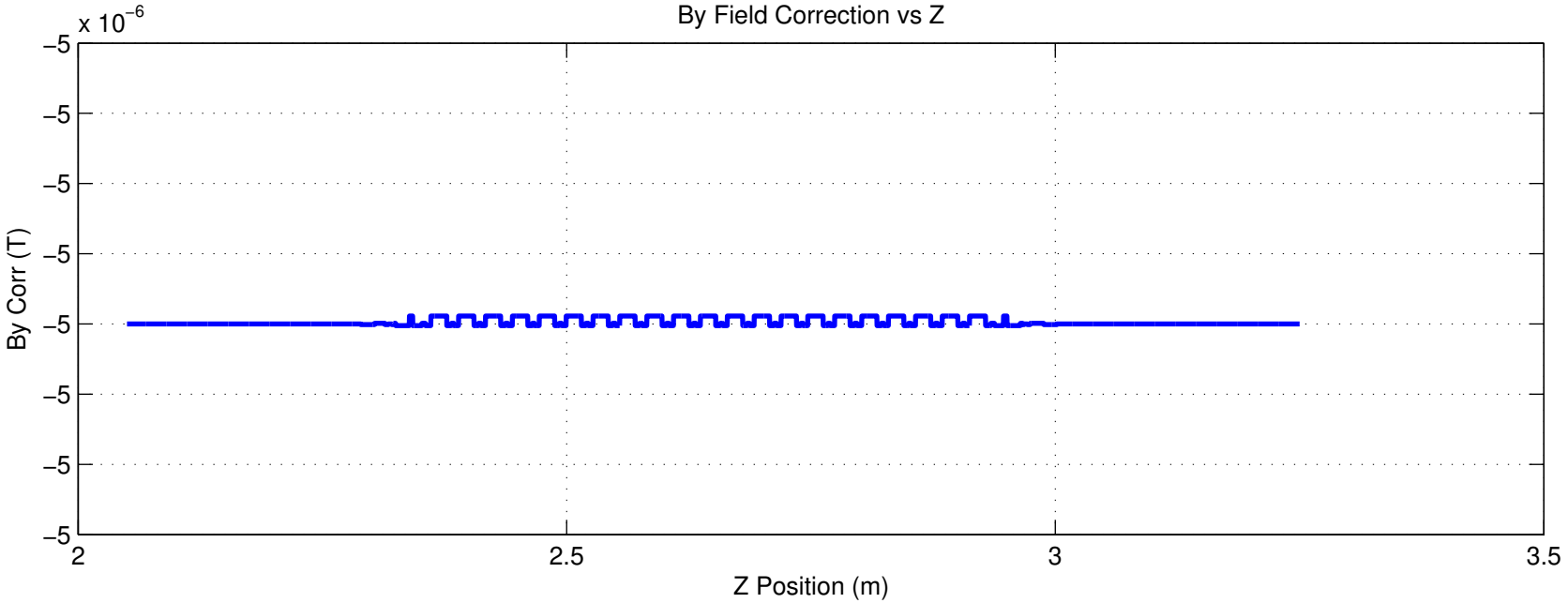
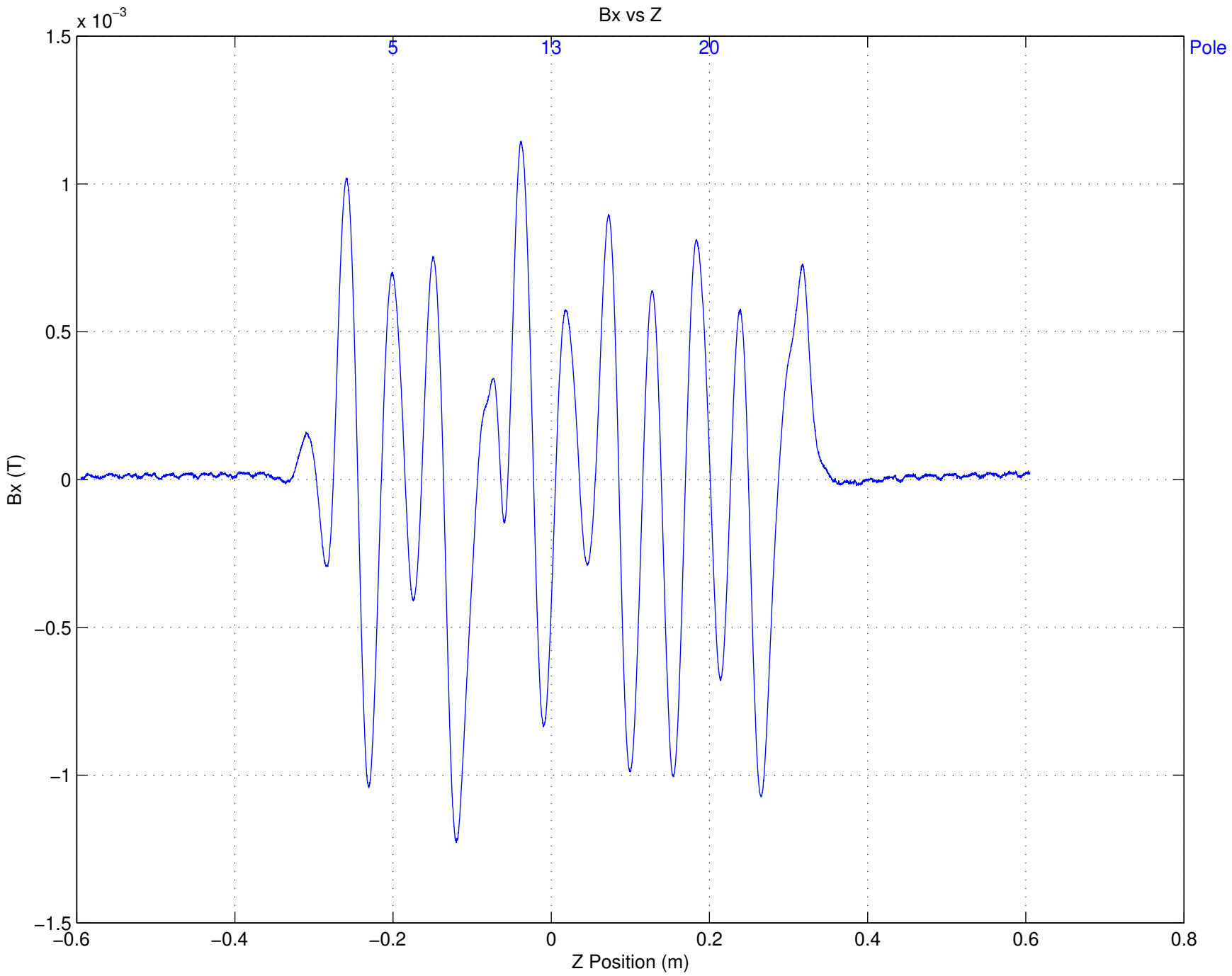
SLAC Magnetic Measurements

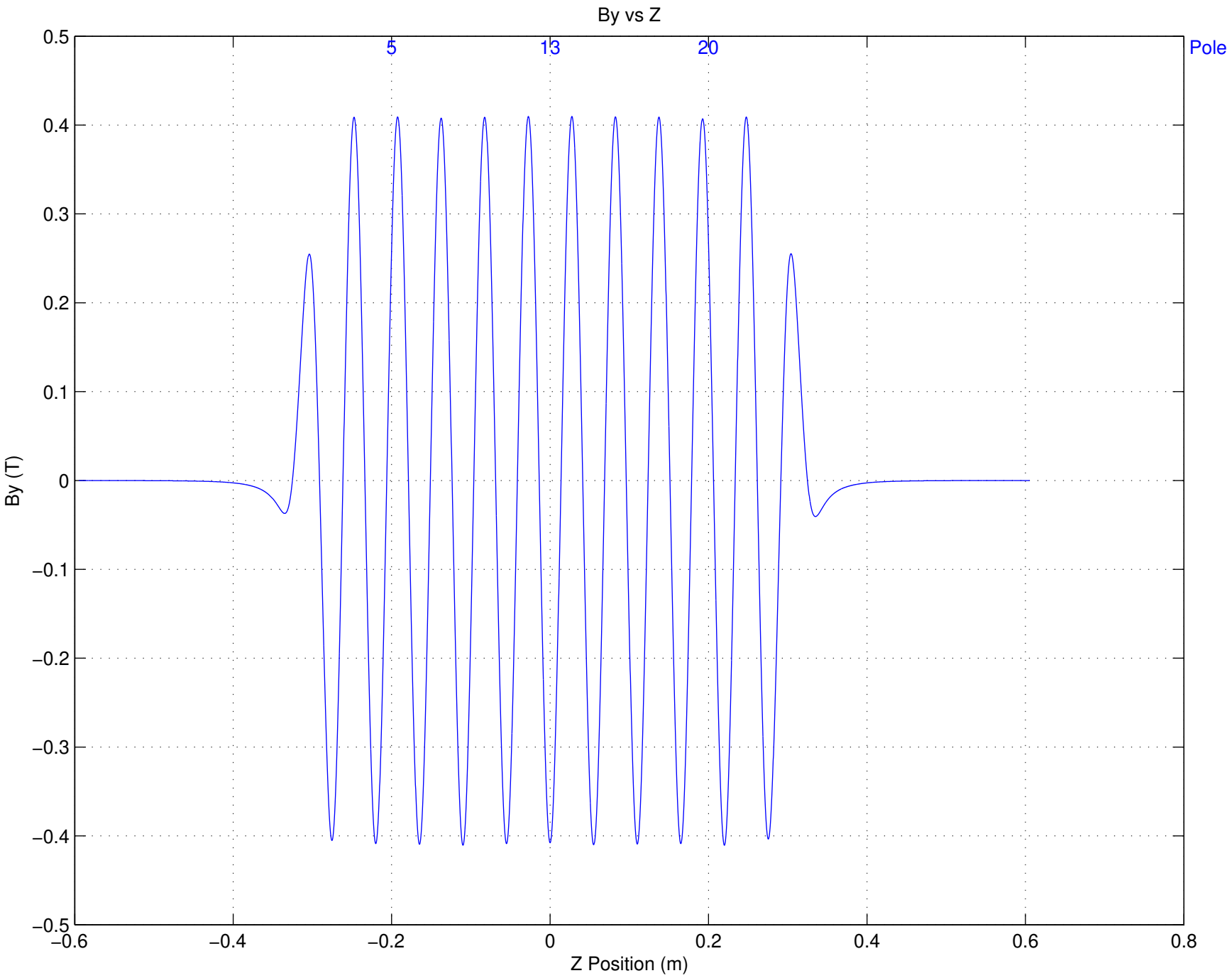
Planar Insertion Device Analysis

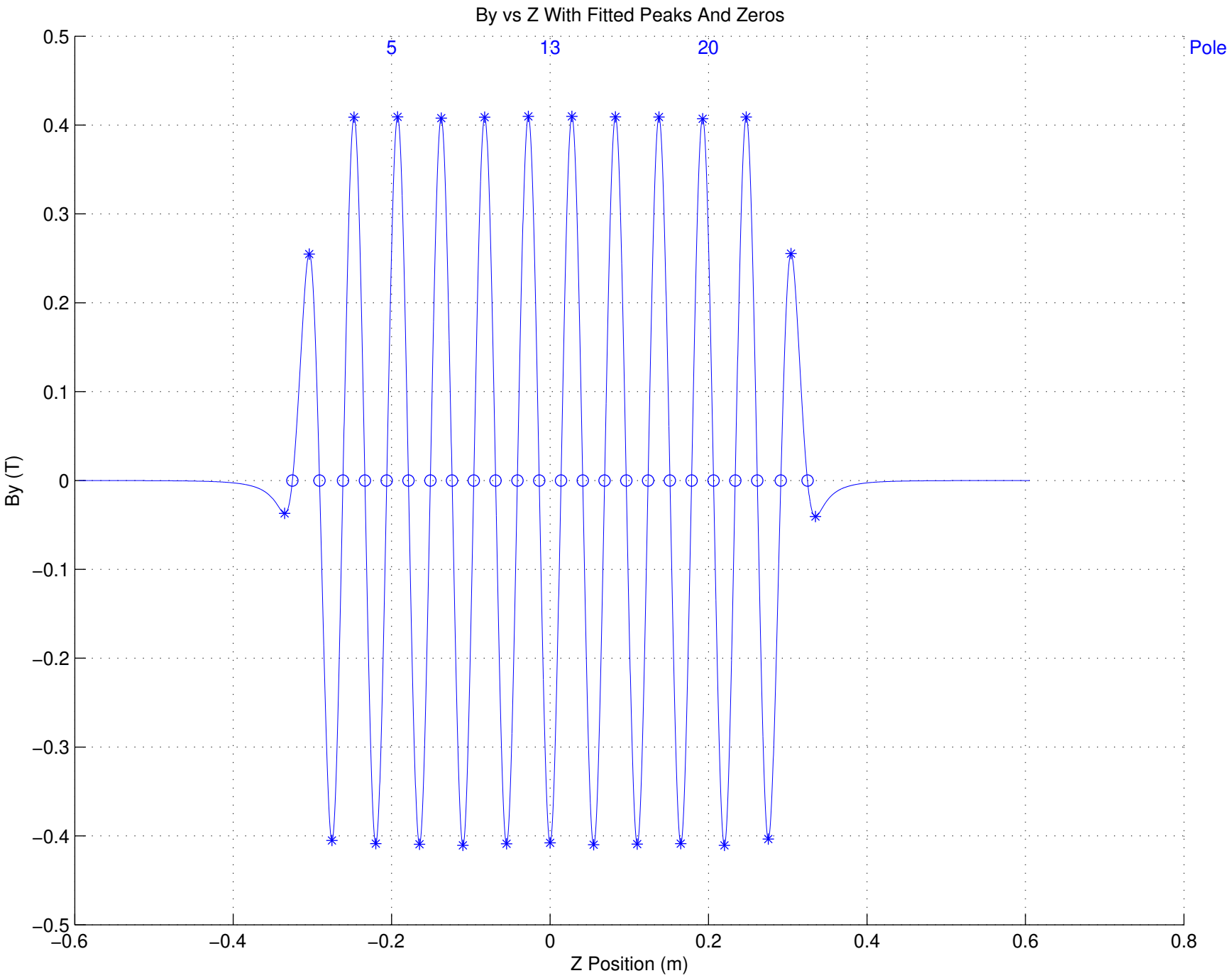
Parameters:
INPUT−FILE−DIR =S:\MagData\LCLS\Undulator\ECKO7−55\DATASET0001\Fine Tuning\Z Scans\Run 009\
INPUT−FILE−NAME =x+00000−y+000−bscanz.dat
INPUT−FILE−TYPE =ZVXYBXYH
CORR−REQUIRED =1
GAMMA =233.3175
NOM−LAMBDA−U =0.055
NOM−K−VALUE =2.0724
NOM−LAMBDA−R =1.59e−006
NUM−POLES =25
NUM−END−POLES =4
CELL−LENGTH =0.4675

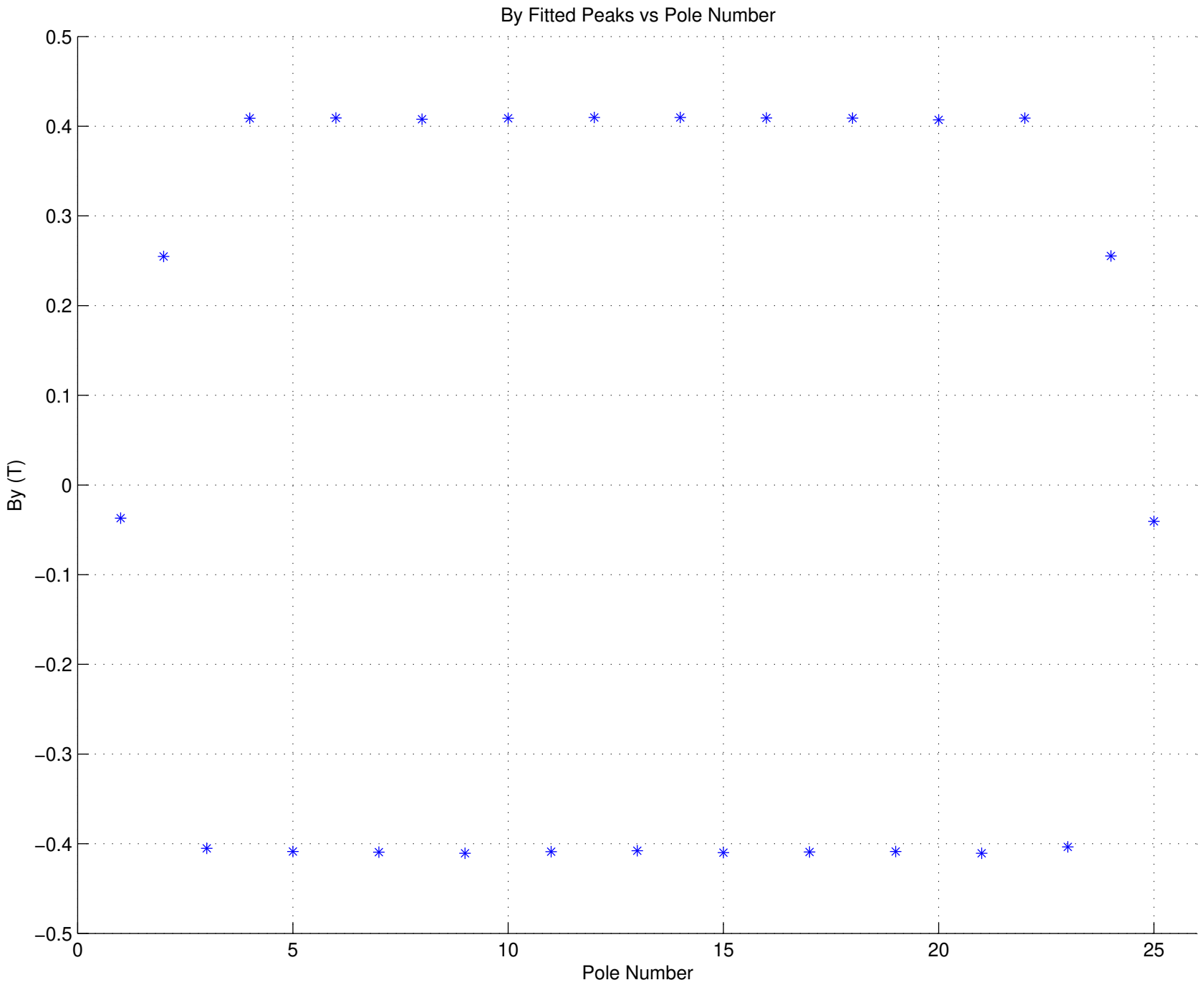

Bx Field Correction vs Z
x 10^-6
Bx Corr (T)
6
6
6
6
6
6
6
6
6
2
2.5
3
3.5

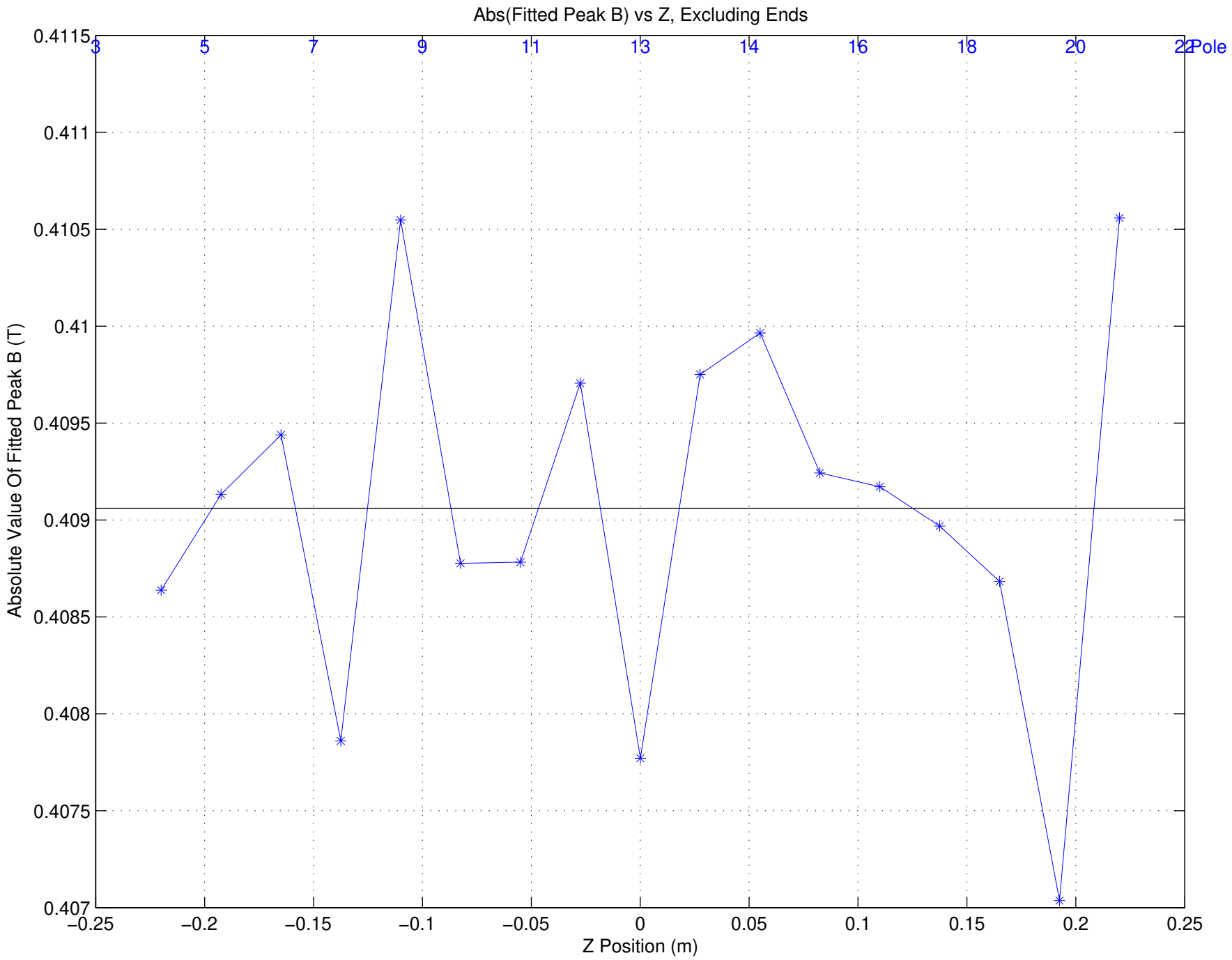

By Field Correction vs Z
x 10^-6
By Corr (T)
−5
−5
−5
−5
−5
−5
−5
−5
−5
2
2.5
3
3.5
Z Position (m)


Bx vs Z
x 10^-3
1.5
1
0.5
0
−0.5
−1
−1.5
Bx (T)
5
13
20
Pole
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z Position (m)

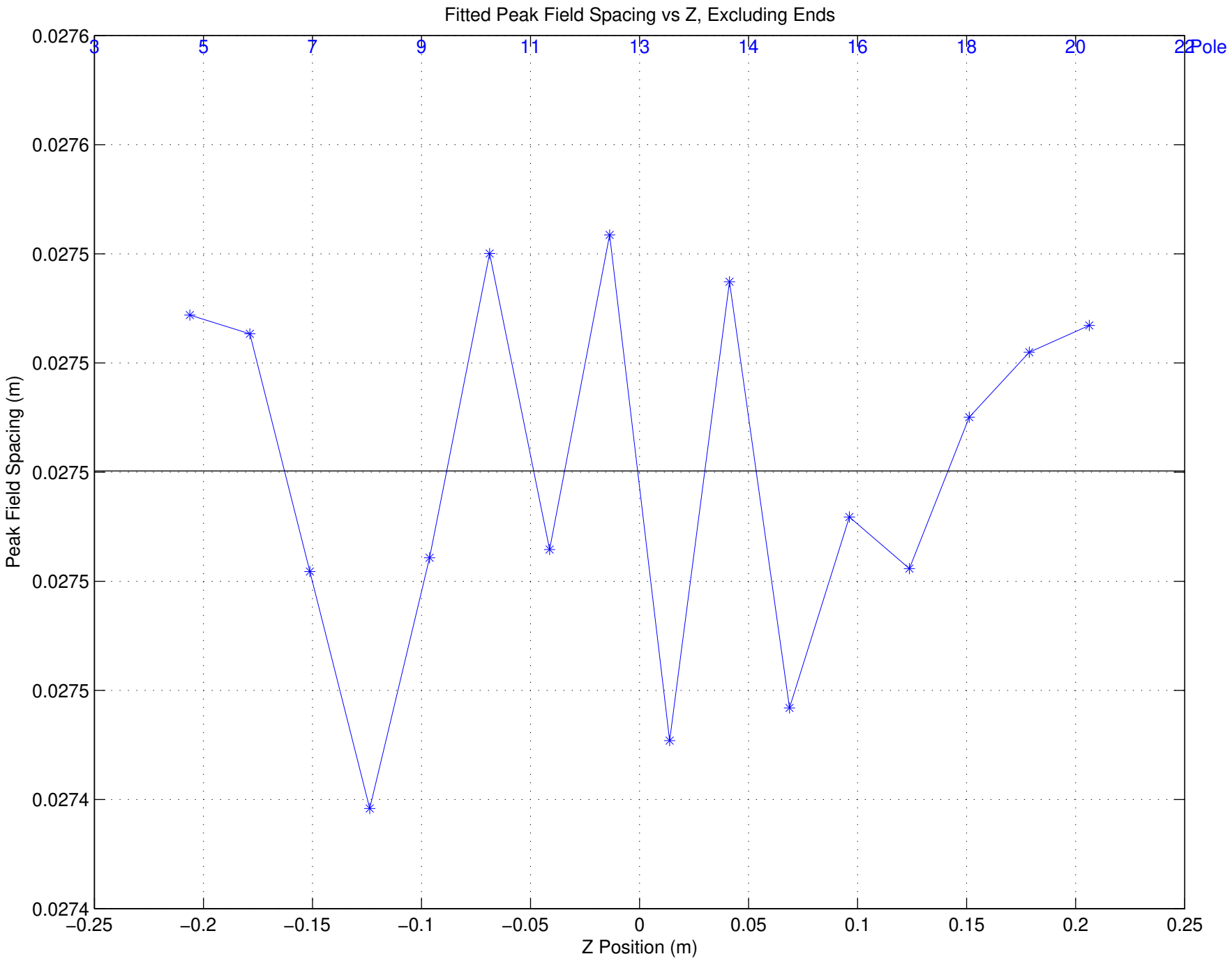

By vs Z
5
13
20
Pole
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
By (T)
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z Position (m)


By vs Z With Fitted Peaks And Zeros
5
13
20
Pole
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
By (T)
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z Position (m)

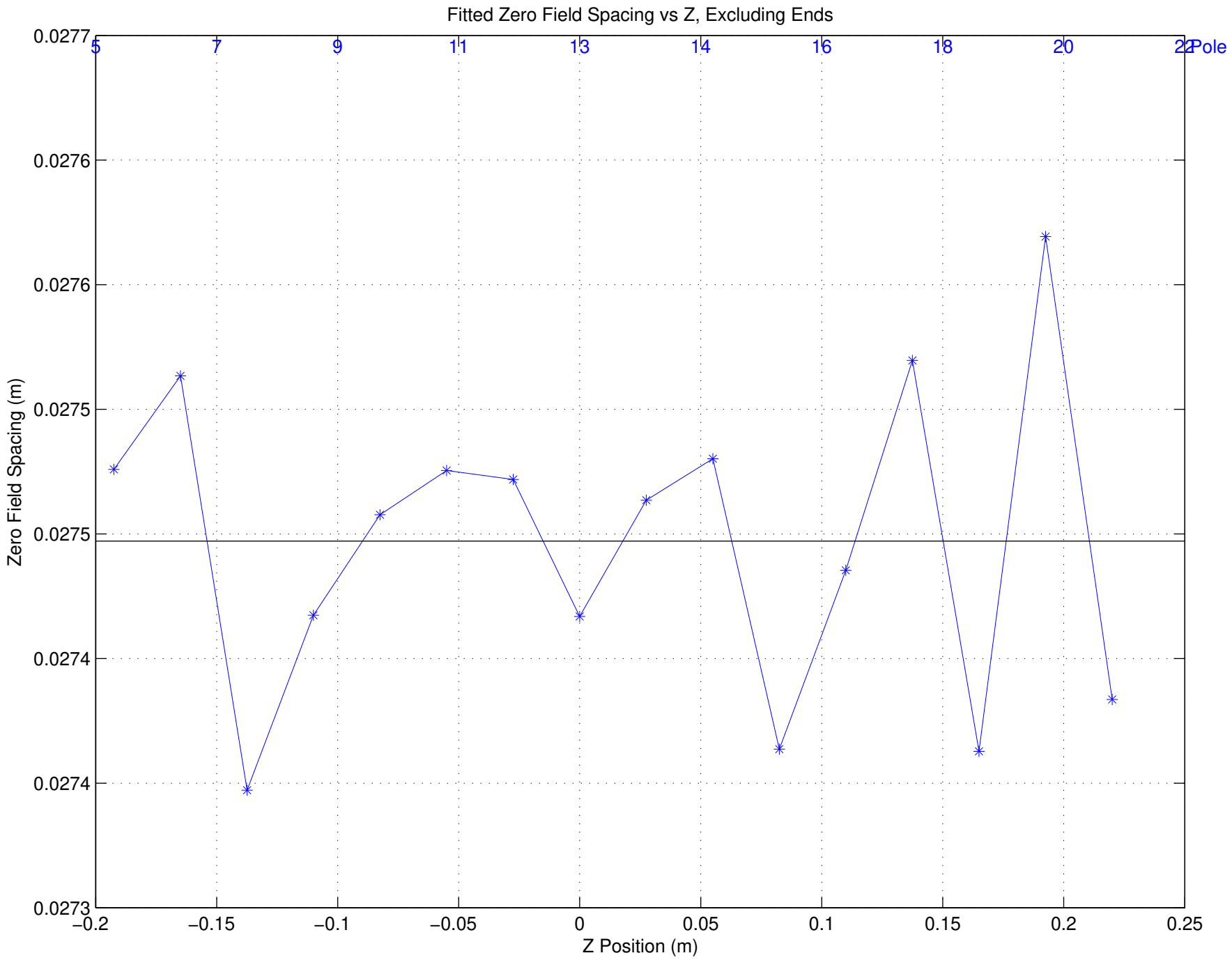

By Fitted Peaks vs Pole Number
By (T)
Pole Number
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
0
5
10
15
20
25



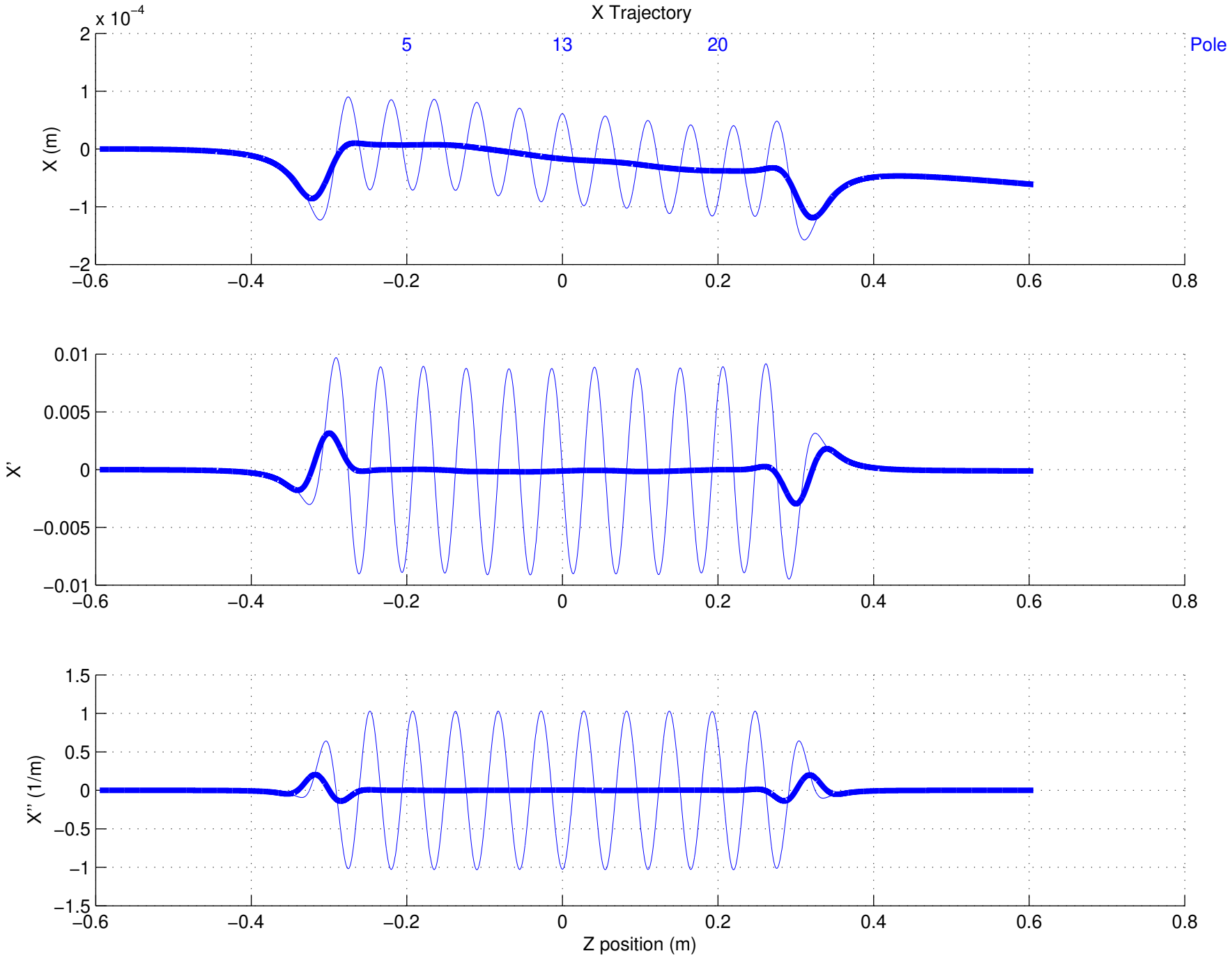
Peak Fields: Ave = 0.409061 T, RMS = 0.000937 T

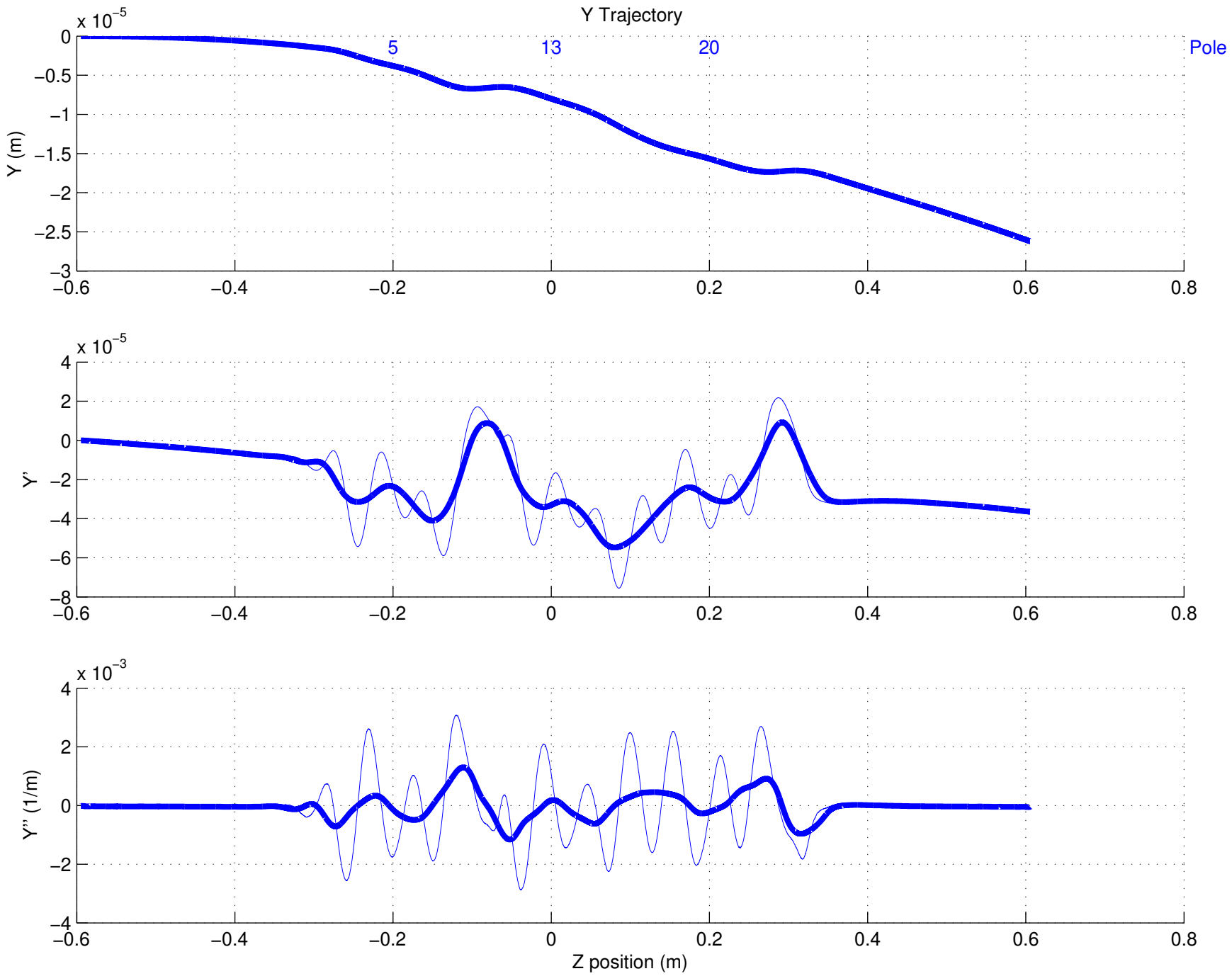


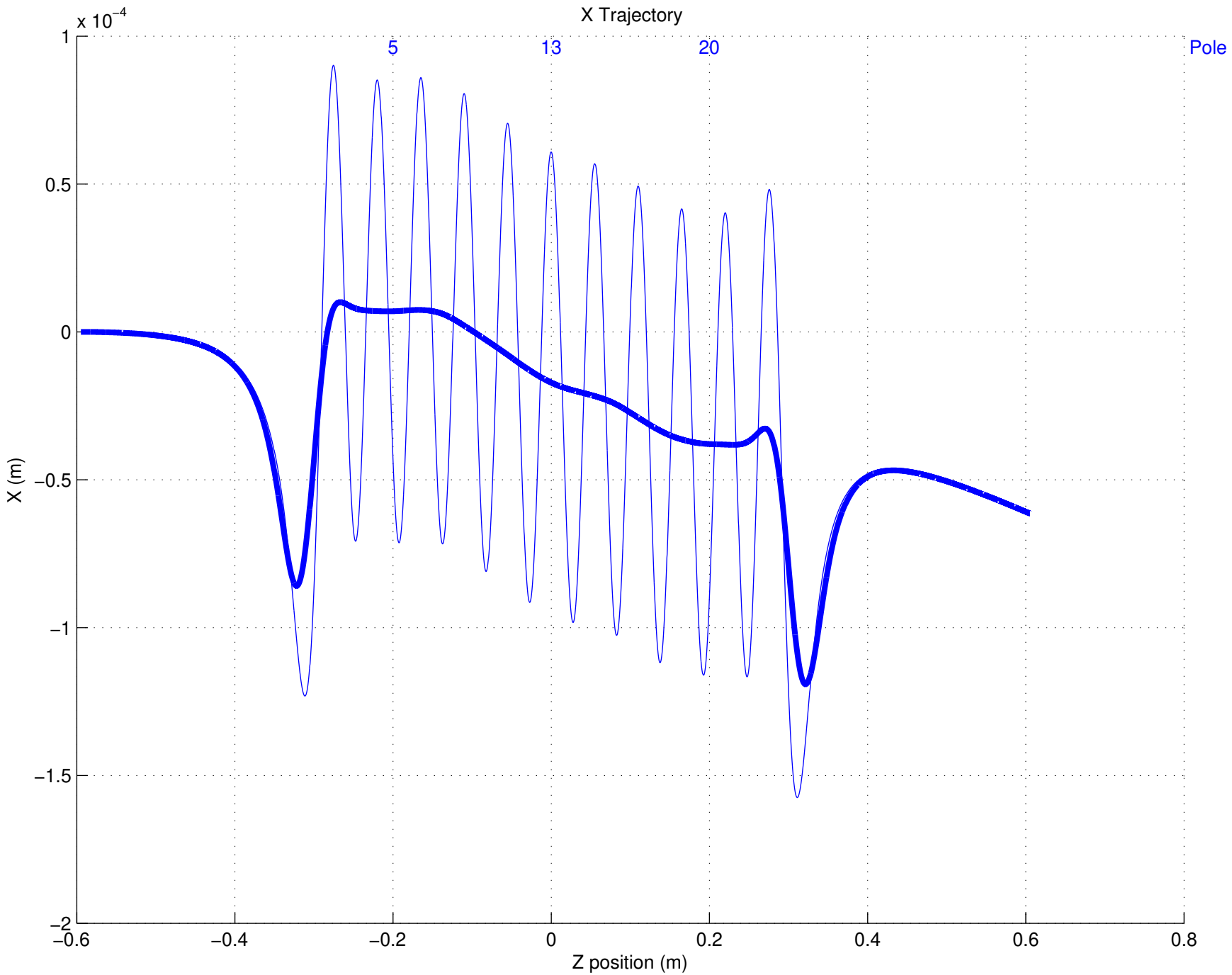
Peak Field Spacing: Ave = 0.027500 m, RMS = 0.000033 m

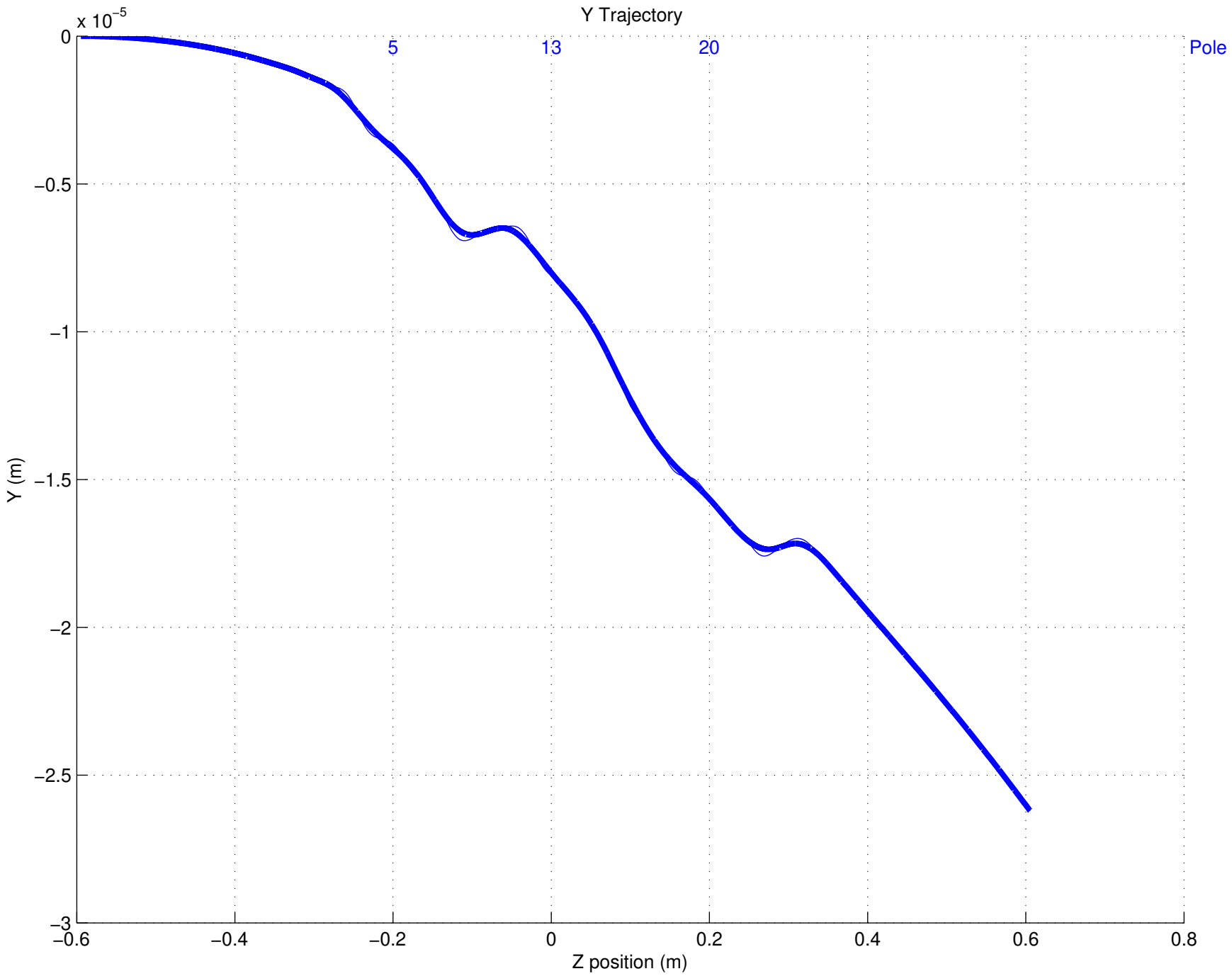


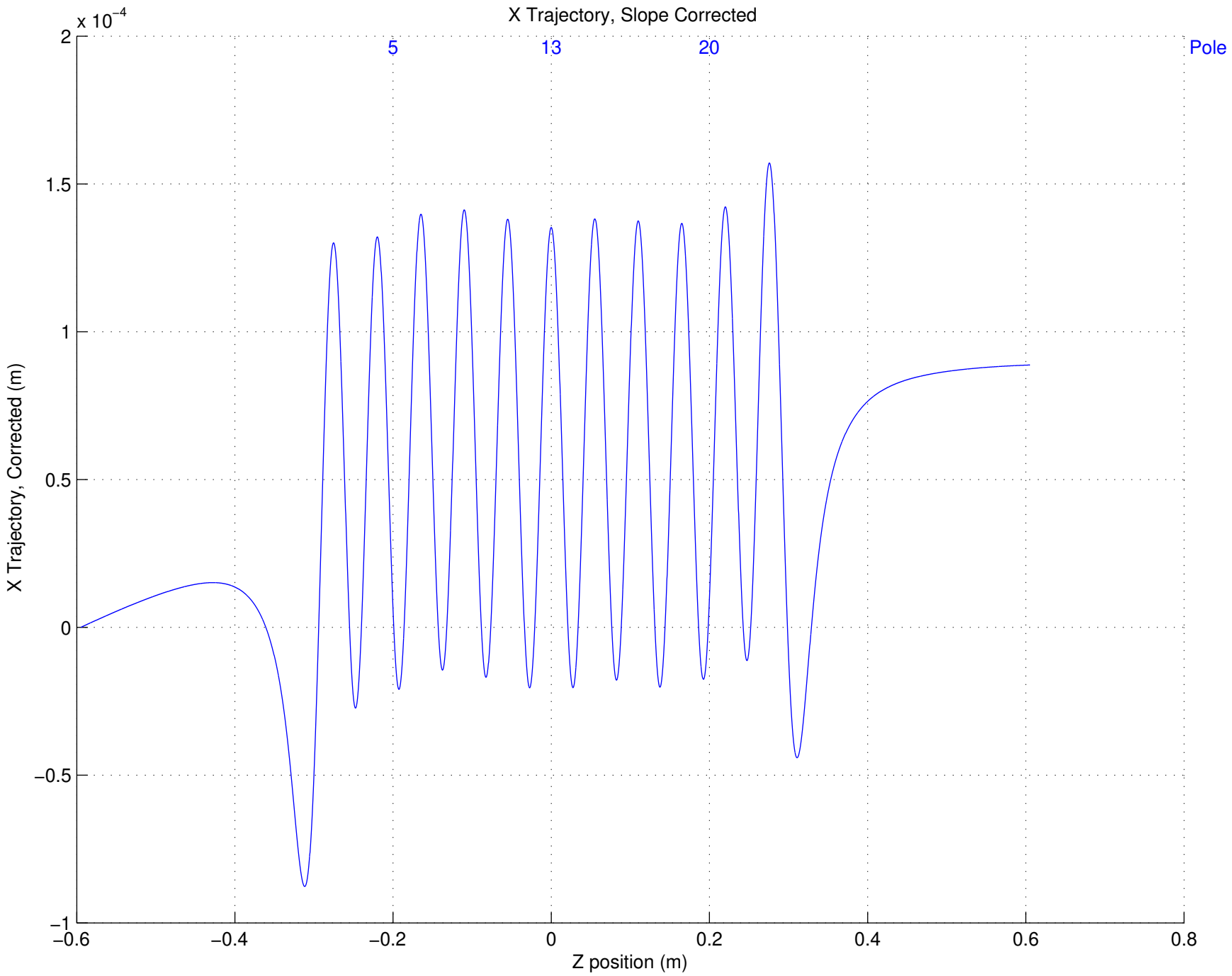
Zero Field Spacing: Ave = 0.027497 m, RMS = 0.000062 m

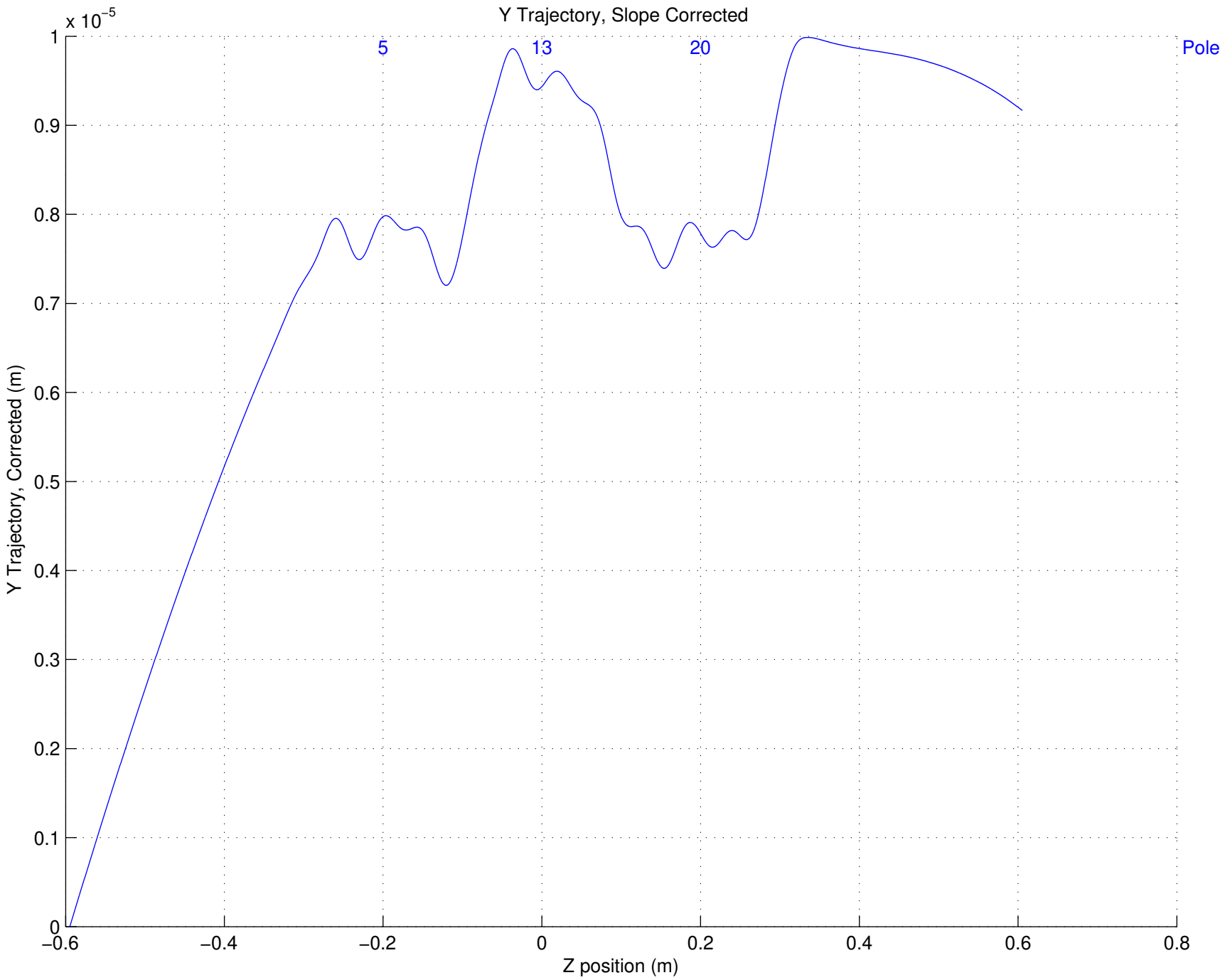

X Trajectory
x 10^-4
5
13
20
Pole
X (m)
X'
X'' (1/m)
Z position (m)

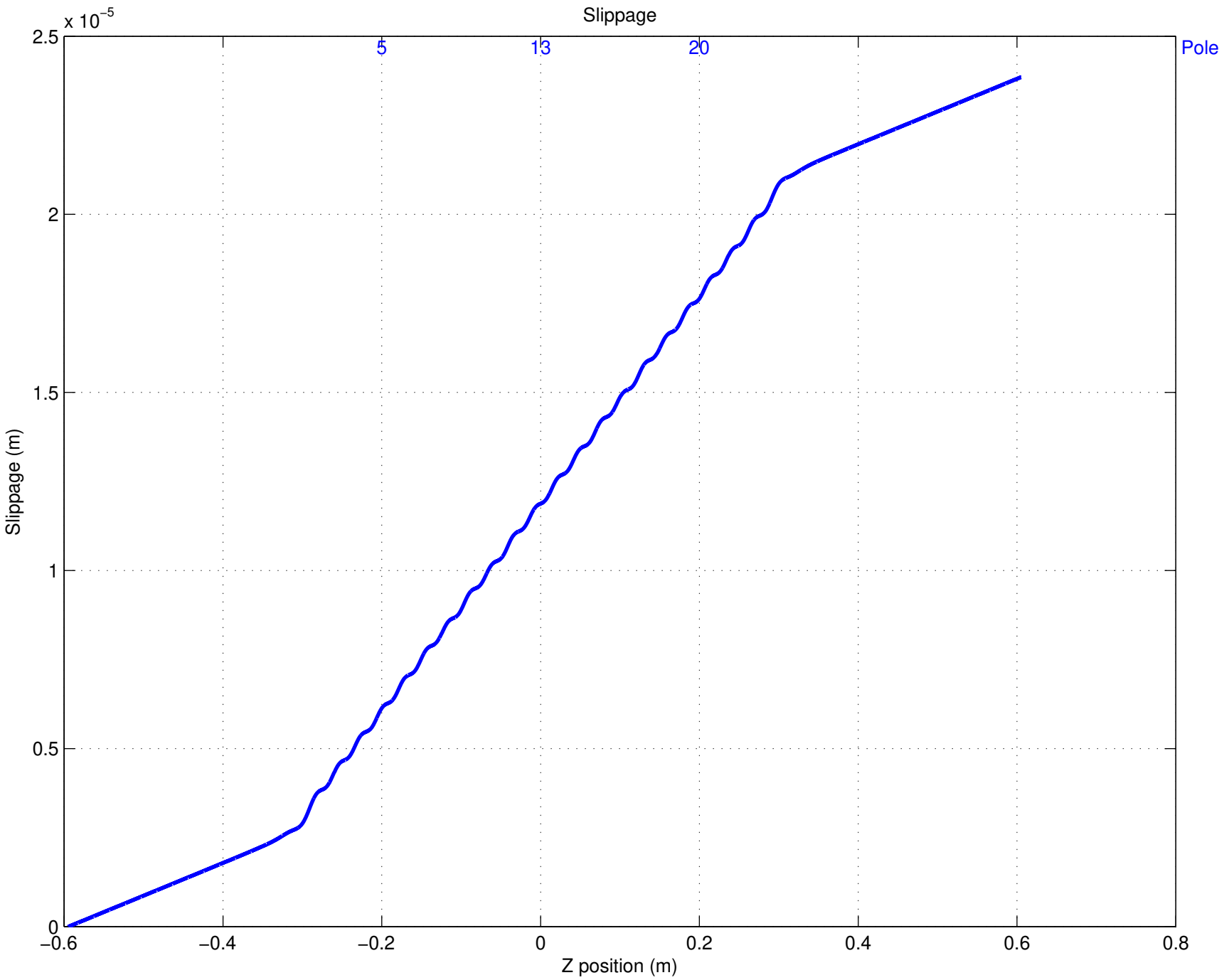

Y Trajectory
x 10^-5
Y (m)
5
13
20
Pole
x 10^-5
Y'
x 10^-3
Y'' (1/m)
Z position (m)

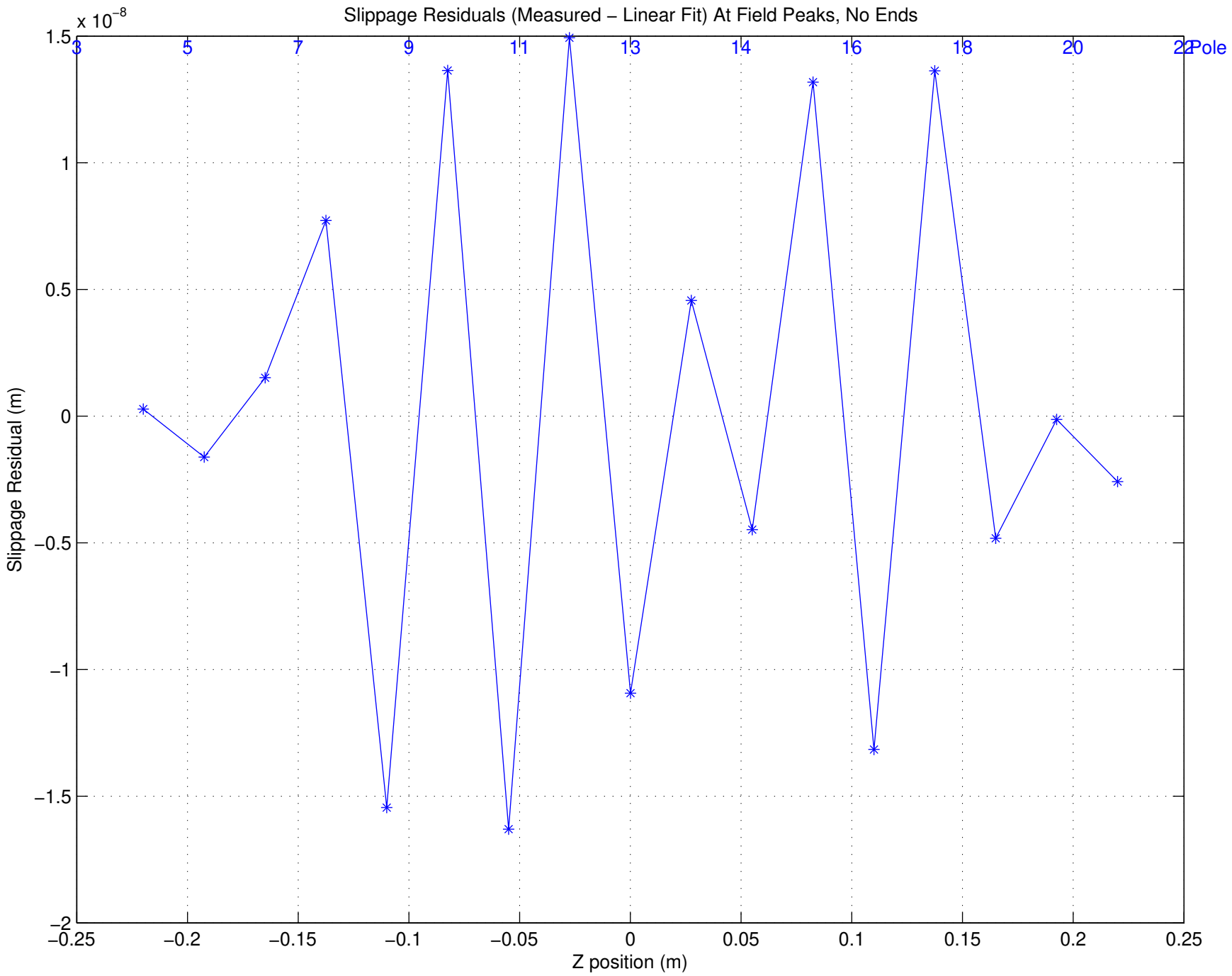

X Trajectory
x 10^-4
1
0.5
0
−0.5
−1
−1.5
−2
X (m)
5
13
20
Pole
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)

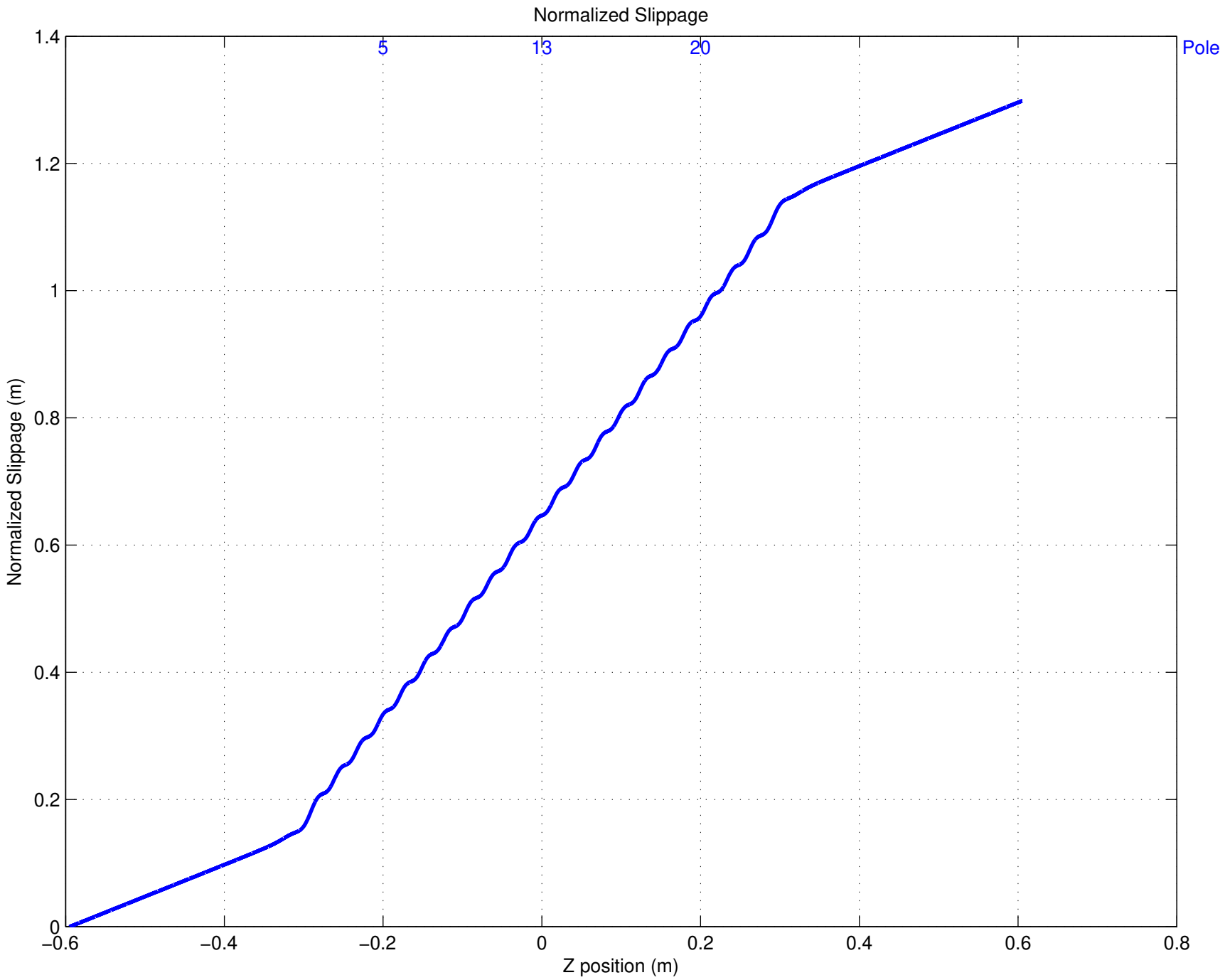

Y Trajectory
x 10^-5
0
−0.5
−1
−1.5
−2
−2.5
−3
Y (m)
5
13
20
Pole
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)

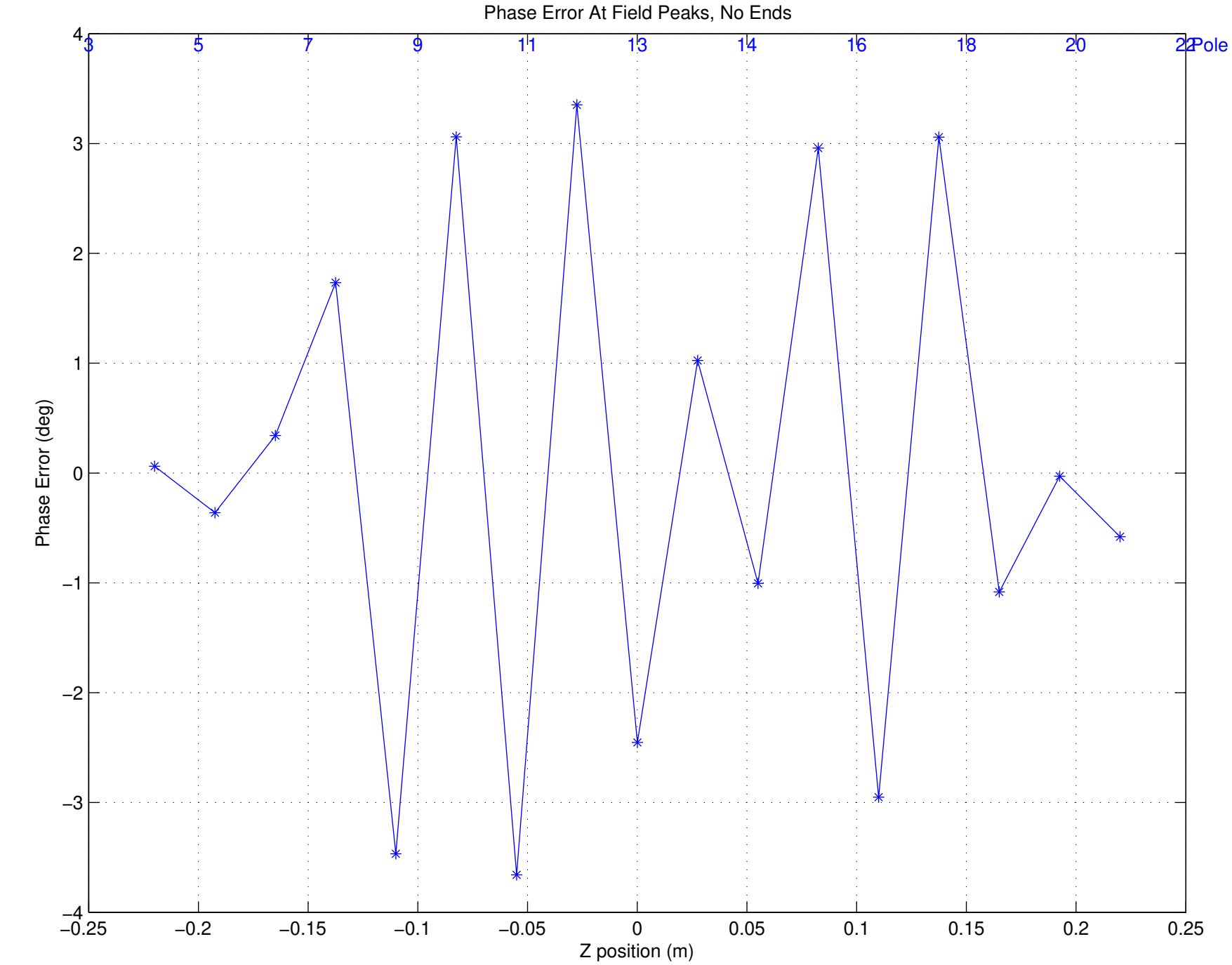

X Trajectory, Slope Corrected
x 10^-4
2
1.5
1
0.5
0
−0.5
−1
5
13
20
Pole
X Trajectory, Corrected (m)
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)


Y Trajectory, Slope Corrected
x 10^-5
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Y Trajectory, Corrected (m)
5
13
20
Pole
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)

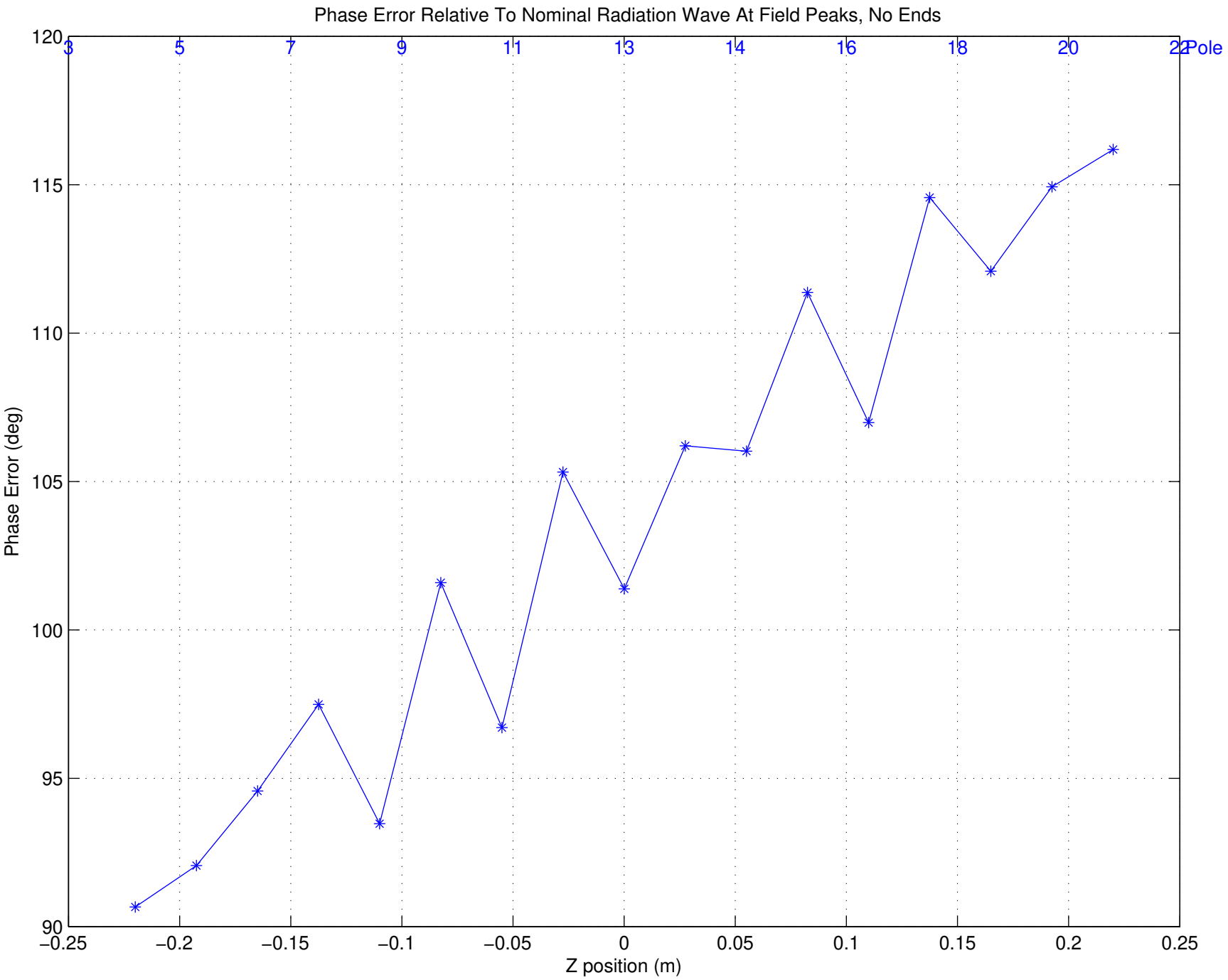

Slippage
x 10^-5
2.5
2
1.5
1
0.5
0
Slippage (m)
5
13
20
Pole
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)


Slippage Residuals (Measured – Linear Fit) At Field Peaks, No Ends
x 10^-8
1.5
1
0.5
0
−0.5
−1
−1.5
−2
3
5
7
9
11
13
14
16
18
20
22
Pole
−0.25
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
0.25
Slippage Residual (m)
Z position (m)


Normalized Slippage
5
13
20
Pole
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Normalized Slippage (m)
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)



Phase Error: Ave = −0.000000 deg, RMS = 2.313920 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
Pole
3
5
7
9
11
13
14
16
18
20
22
120
115
110
105
100
95
90
Phase Error (deg)
−0.25
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
0.25
Z position (m)