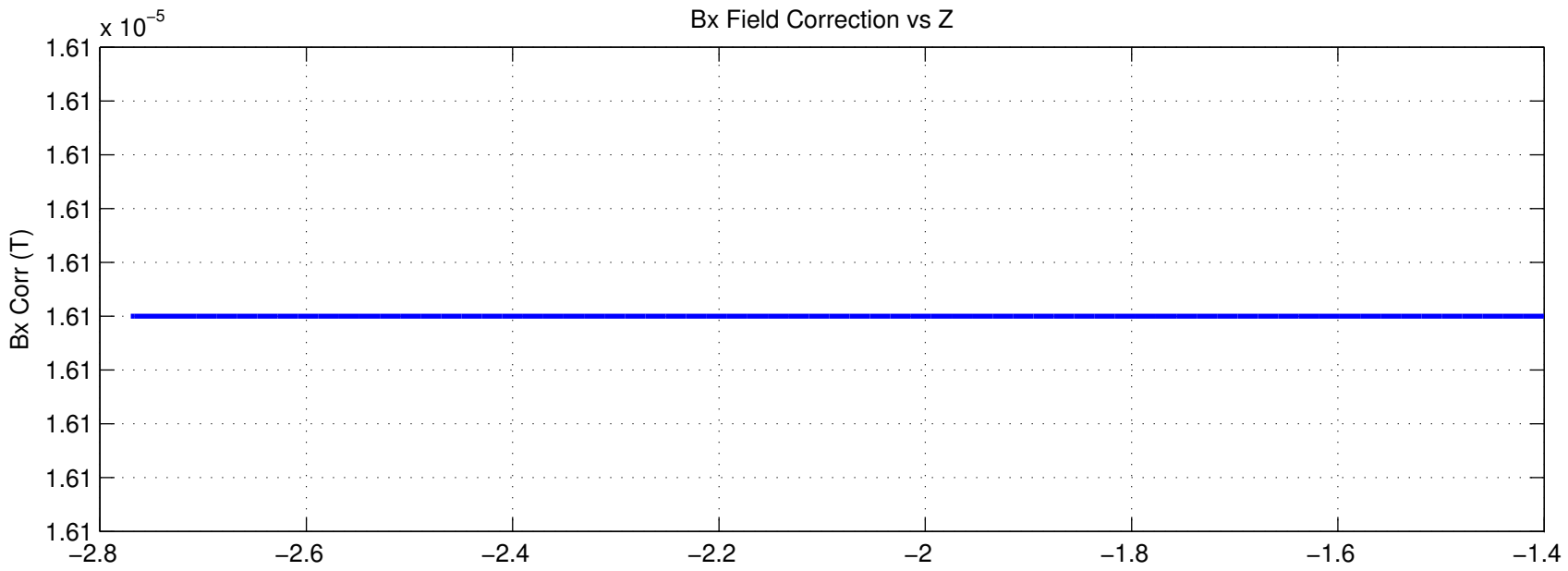
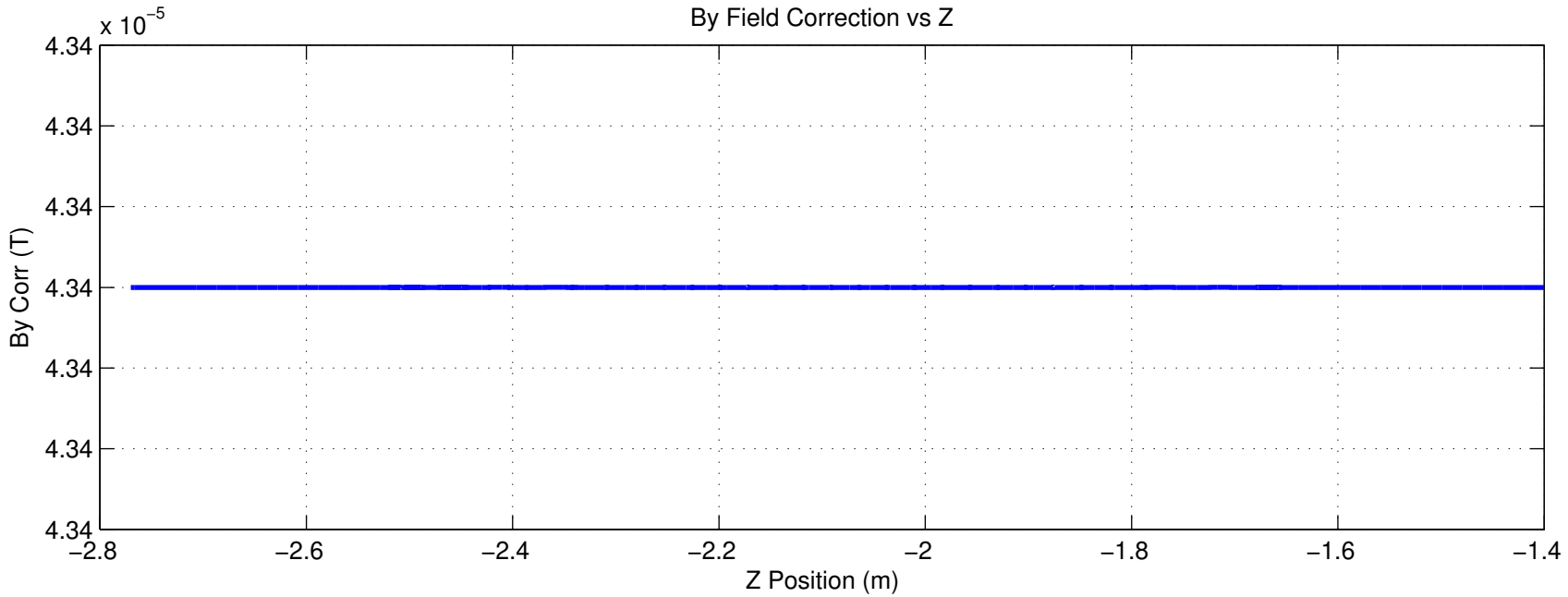
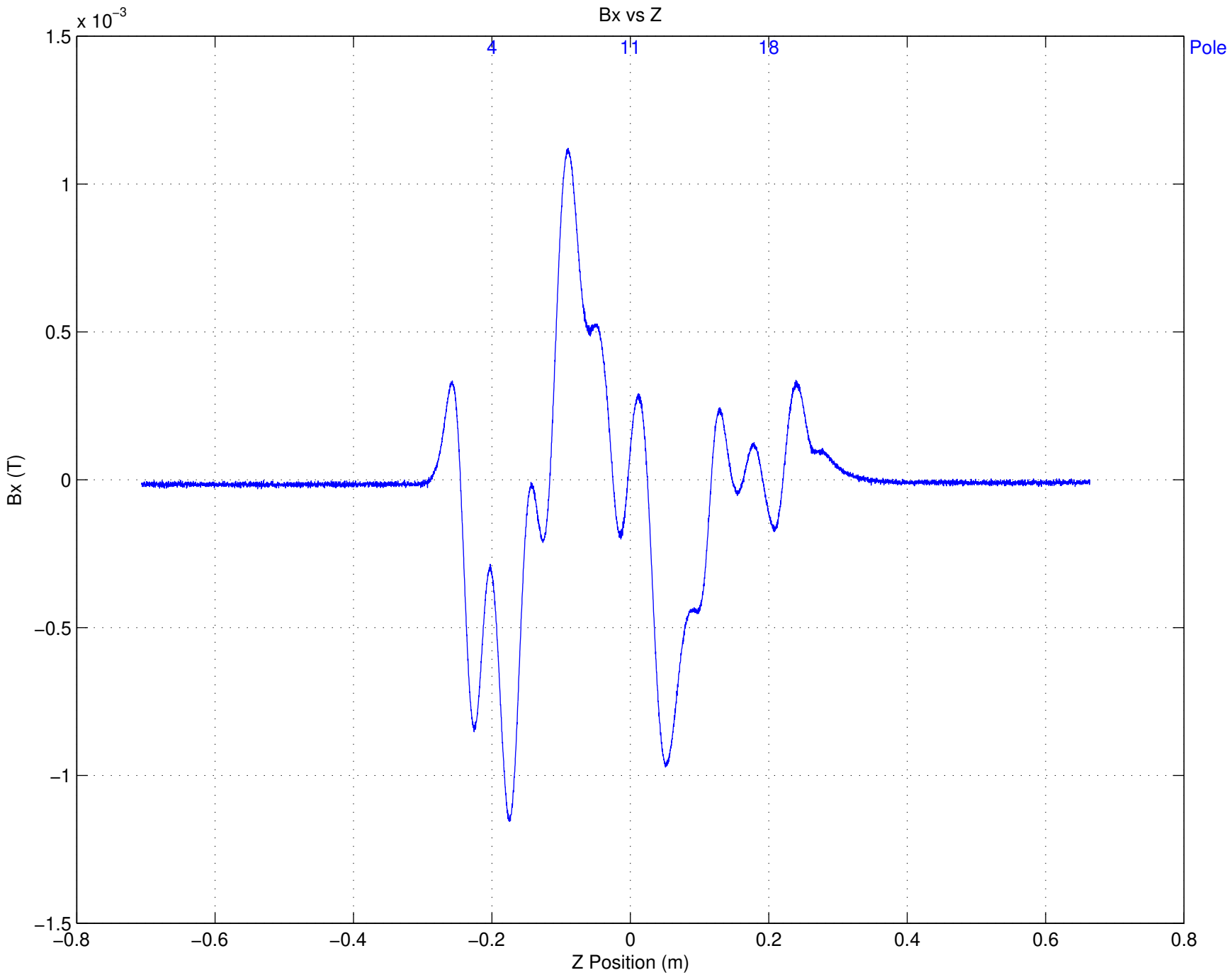
SLAC Magnetic Measurements

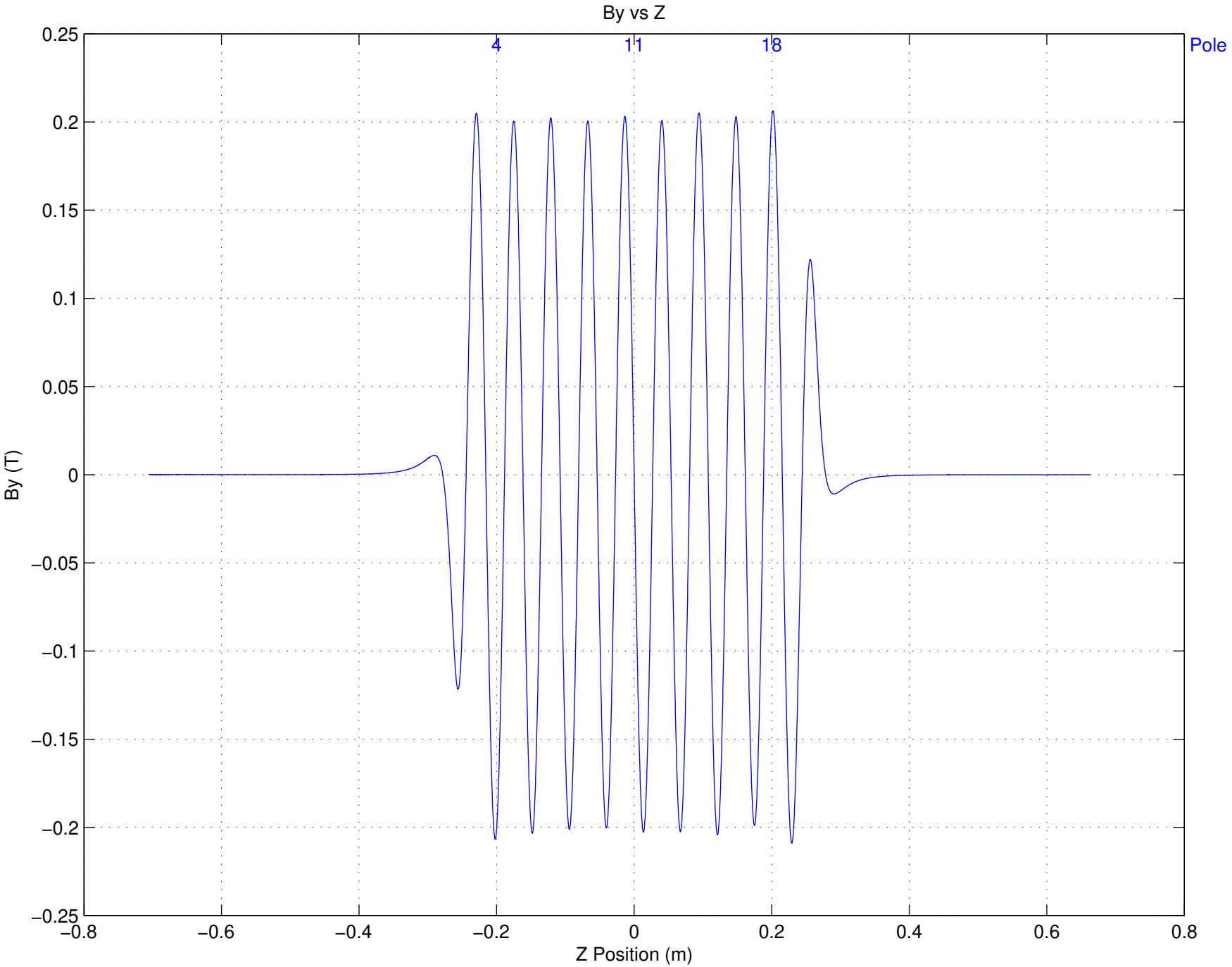
Planar Insertion Device Analysis

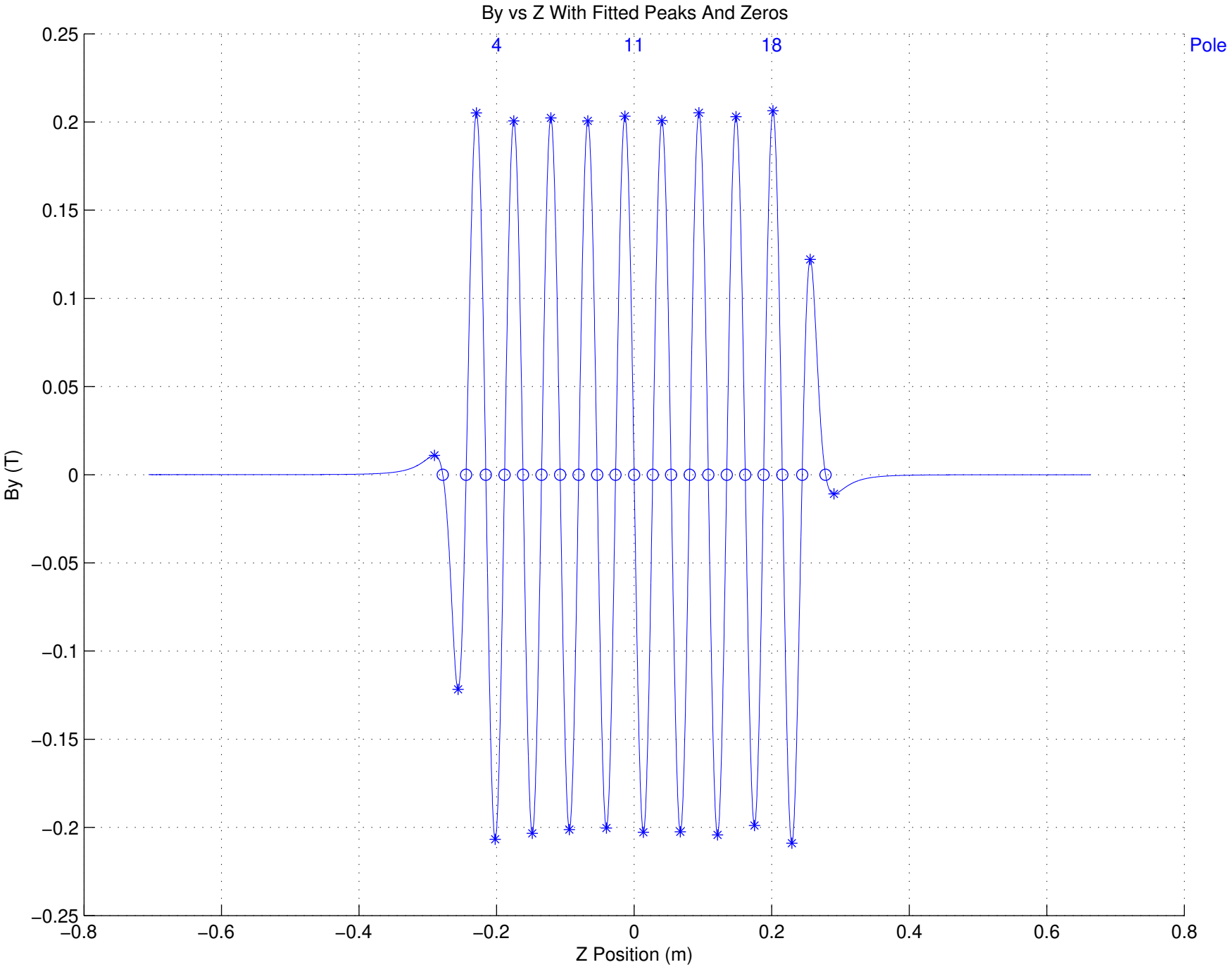
Parameters:
INPUT−FILE−DIR =S:\MagData\LCLS\Undulator\mag000\DATASET0001\Rough Tuning\Z Scans\Run 006\
INPUT−FILE−NAME =x+00000−y+000−bscanz.dat
INPUT−FILE−TYPE =ZVXYBXYH
CORR−REQUIRED =1
GAMMA =264.1884
NOM−LAMBDA−U =0.054
NOM−K−VALUE =1.385
NOM−LAMBDA−R =7.5787e−007
NUM−POLES =22
NUM−END−POLES =4
CELL−LENGTH =0.351

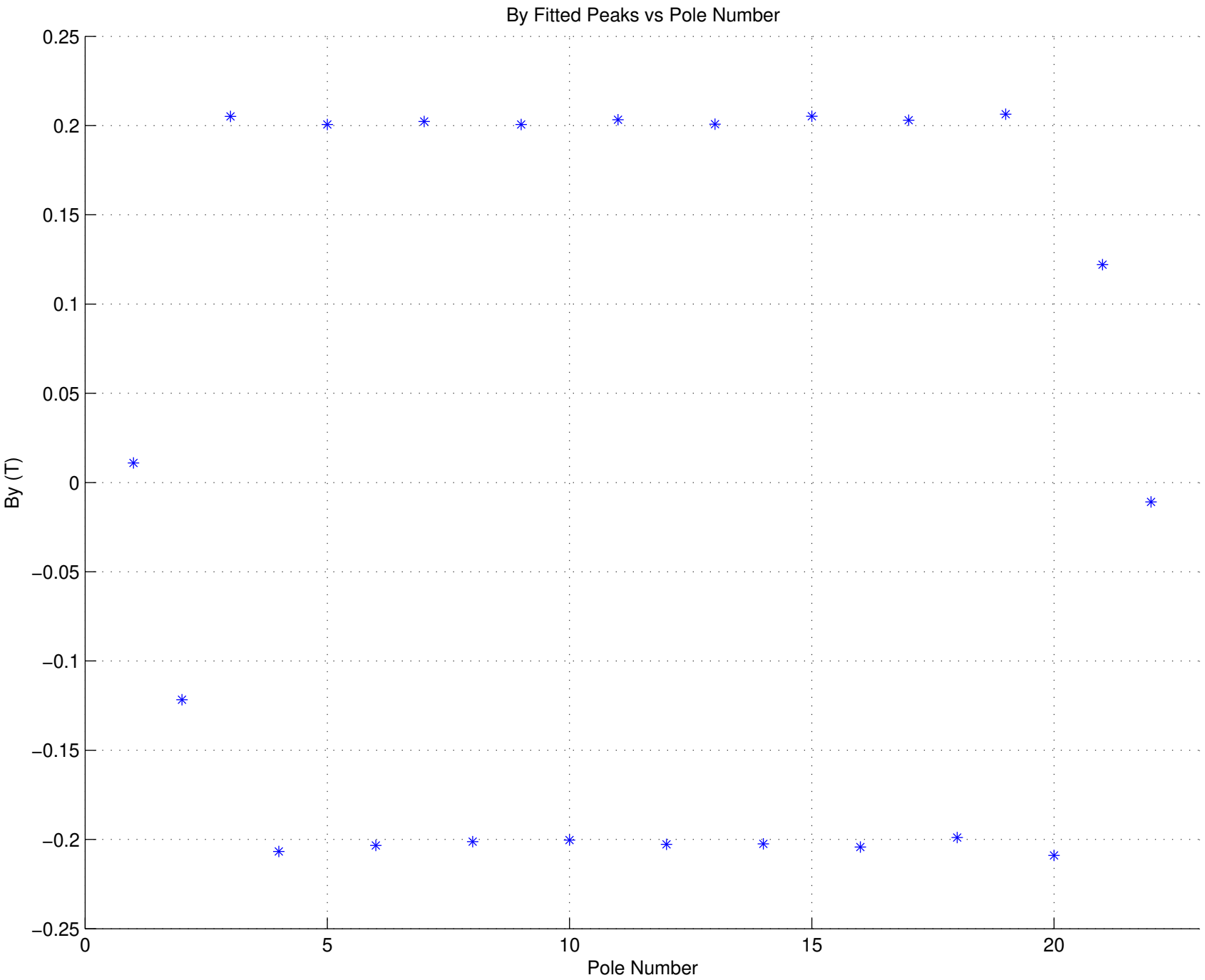

Bx Field Correction vs Z
x 10^-5
1.61
1.61
1.61
1.61
1.61
1.61
1.61
1.61
1.61
Bx Corr (T)
−2.8
−2.6
−2.4
−2.2
−2
−1.8
−1.6
−1.4

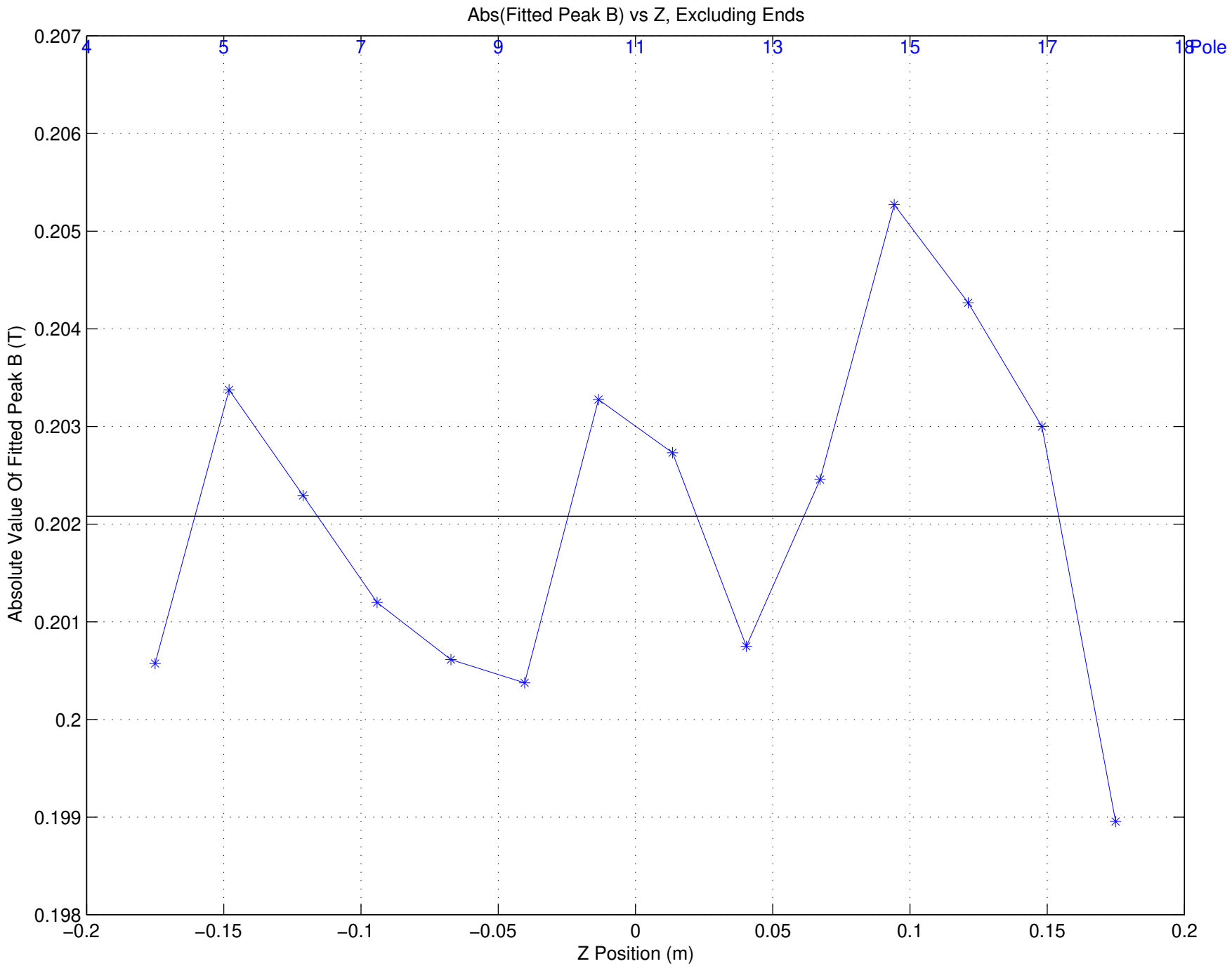

By Field Correction vs Z
x 10^-5
4.34
4.34
4.34
4.34
4.34
4.34
4.34
By Corr (T)
−2.8
−2.6
−2.4
−2.2
−2
−1.8
−1.6
−1.4
Z Position (m)


Bx vs Z
x 10^-3
1.5
1
0.5
0
−0.5
−1
−1.5
Bx (T)
4
11
18
Pole
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z Position (m)

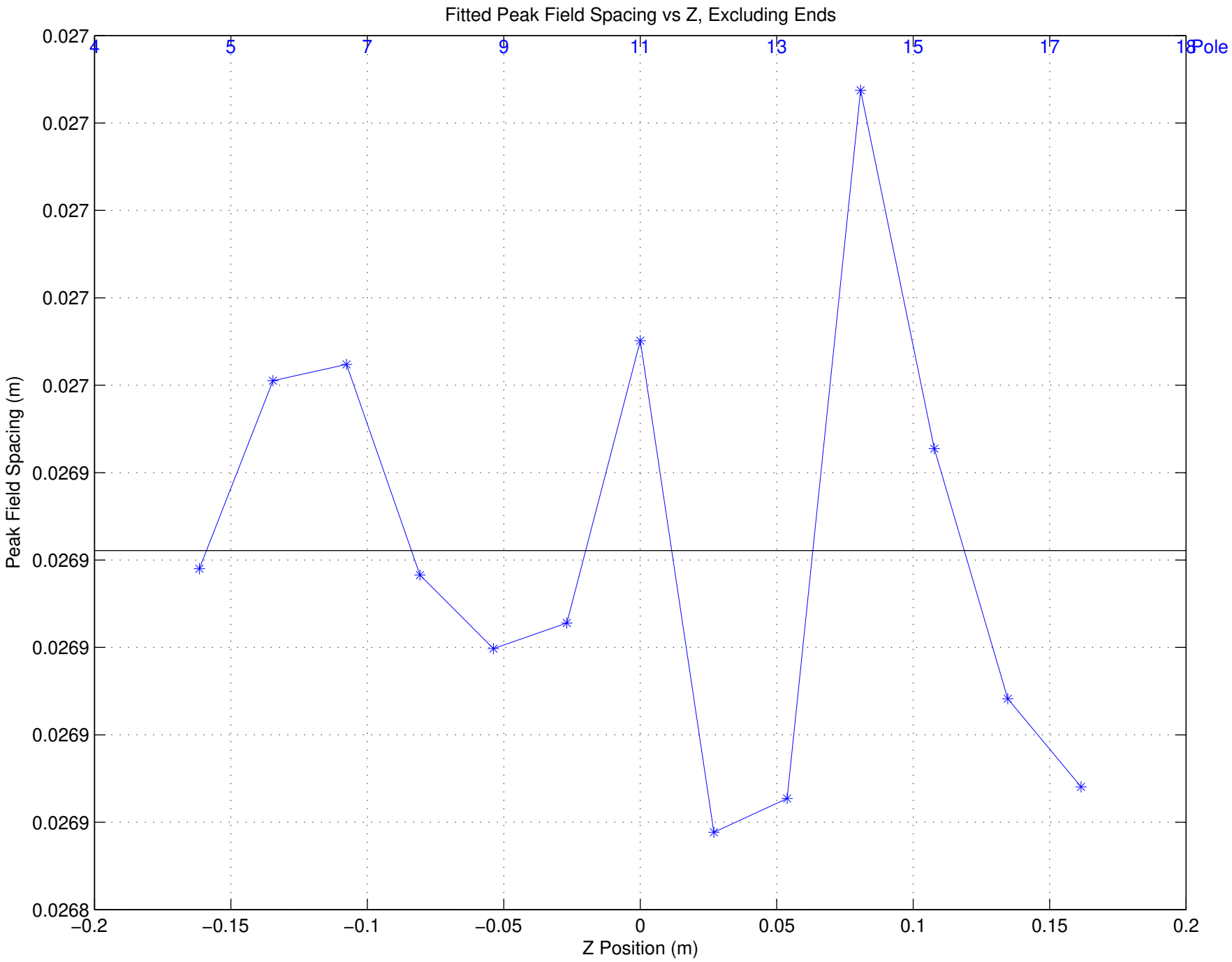

By vs Z
4
11
18
Pole
0.25
0.2
0.15
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
−0.25
By (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z Position (m)


By vs Z With Fitted Peaks And Zeros
4
11
18
Pole
0.25
0.2
0.15
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
−0.25
By (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z Position (m)

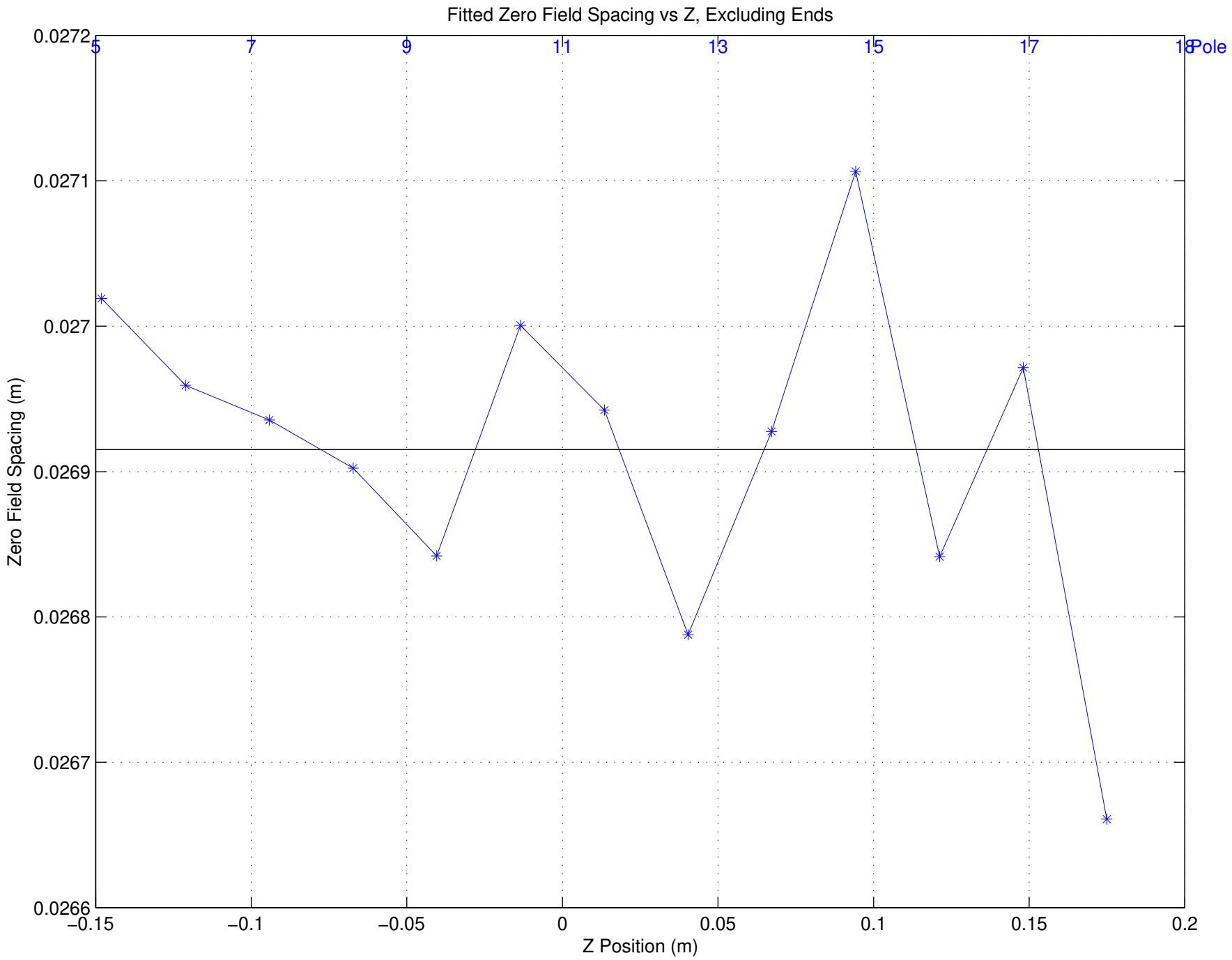

By Fitted Peaks vs Pole Number
By (T)
Pole Number
0.25
0.2
0.15
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
−0.25
0
5
10
15
20



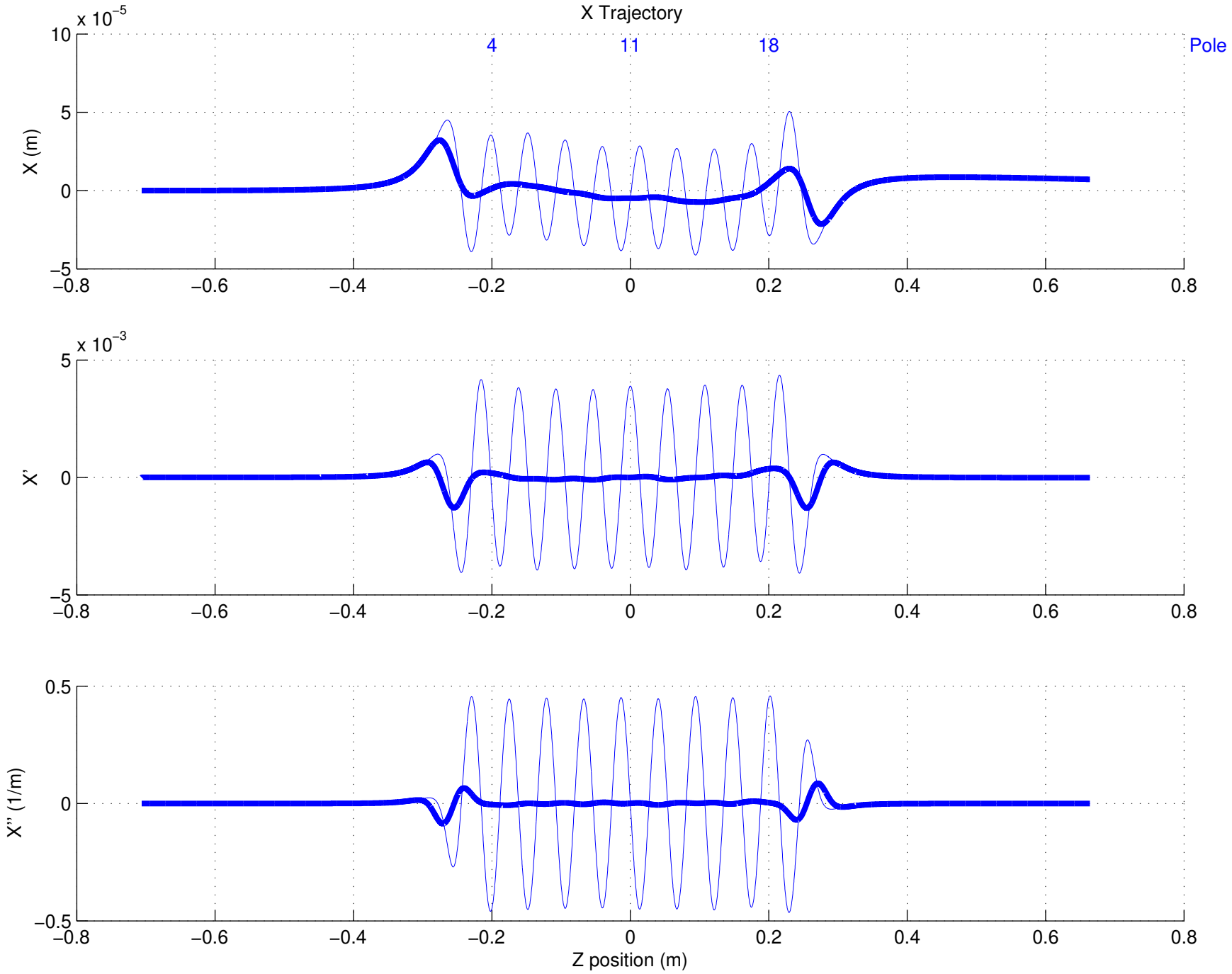
Peak Fields: Ave = 0.202080 T, RMS = 0.001736 T

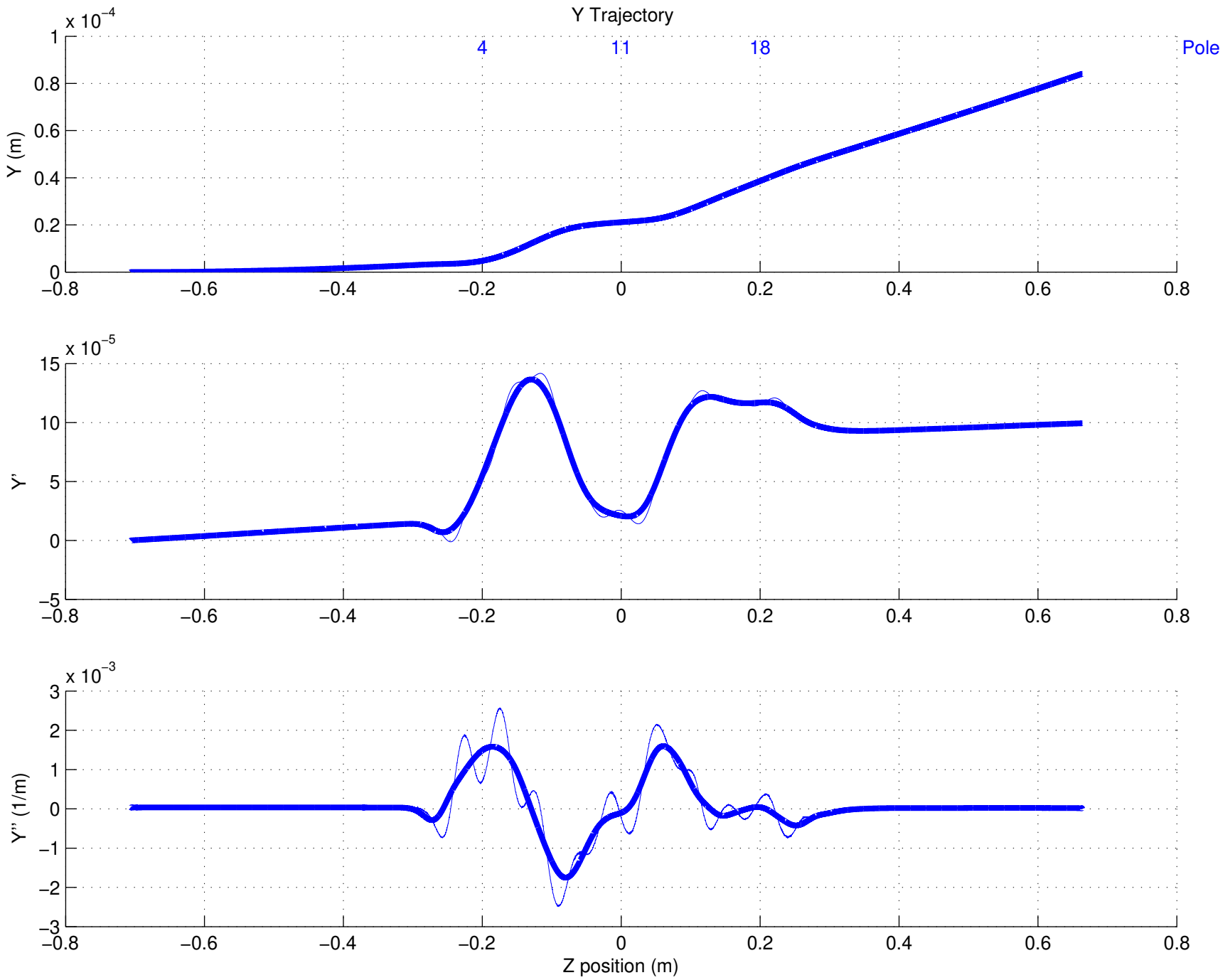


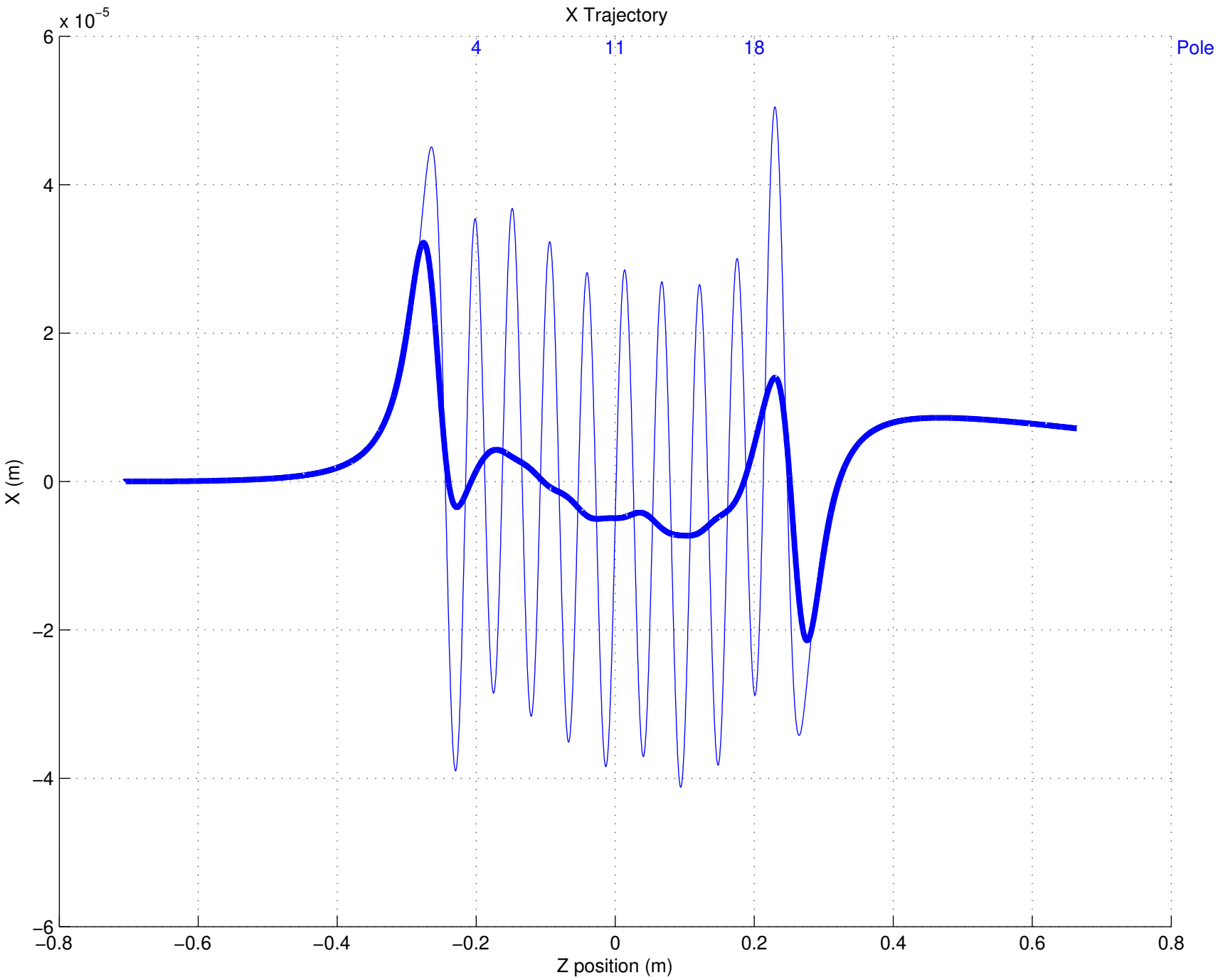
Peak Field Spacing: Ave = 0.026922 m, RMS = 0.000050 m

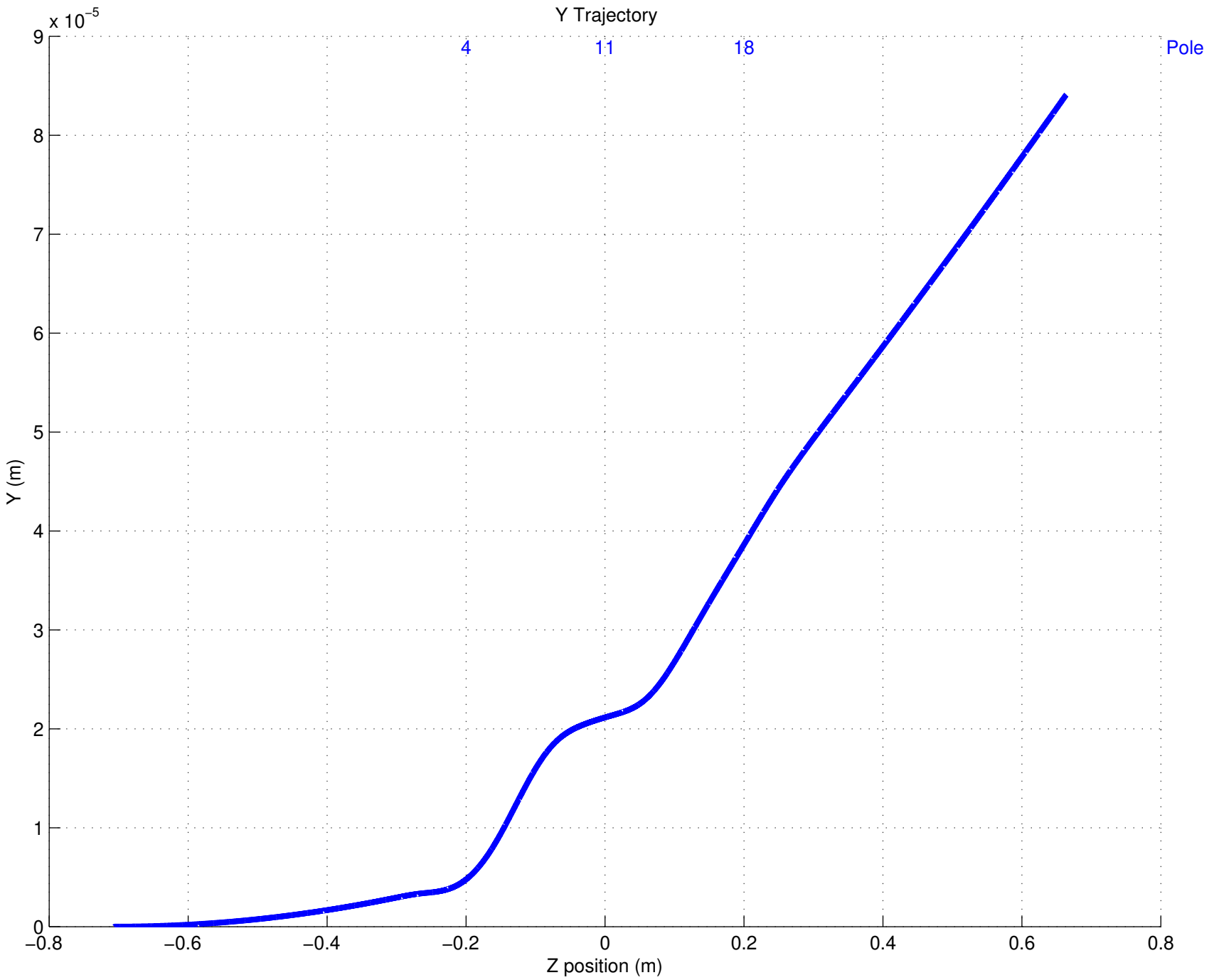


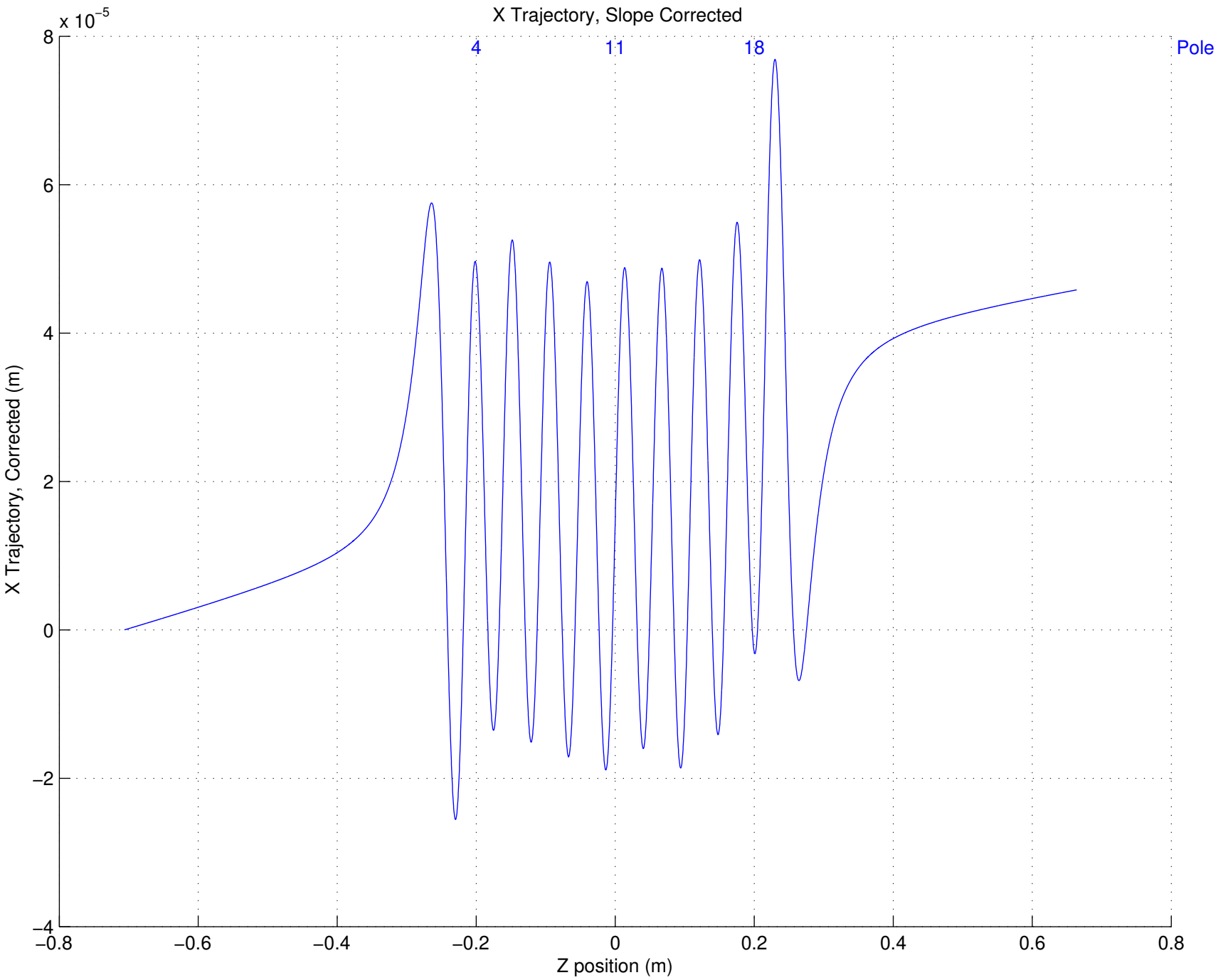
Zero Field Spacing: Ave = 0.026915 m, RMS = 0.000113 m

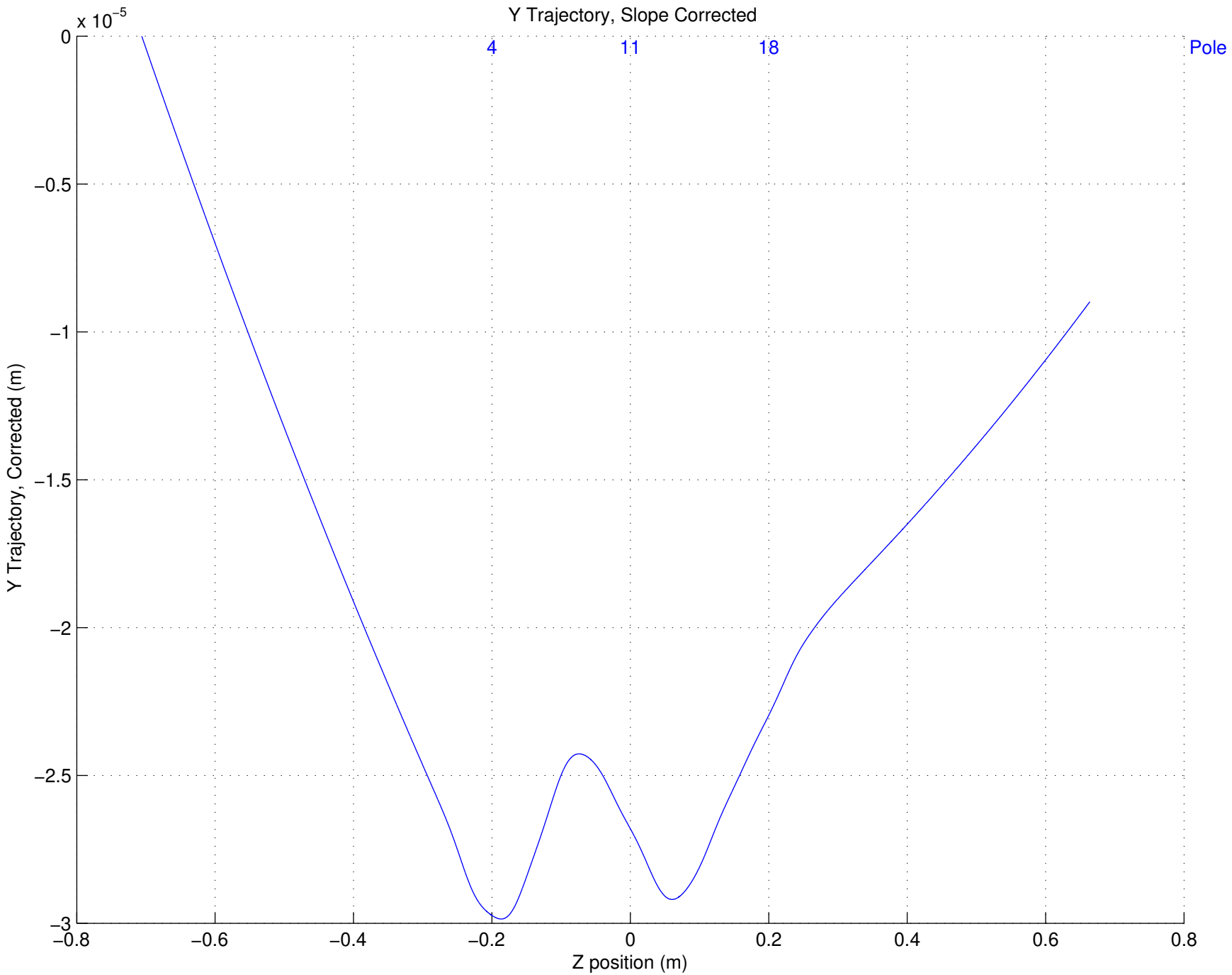

X Trajectory
x 10^-5
10
5
0
−5
X (m)
4
11
18
Pole
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
x 10^-3
5
0
−5
X'
0.5
0
−0.5
X'' (1/m)
Z position (m)

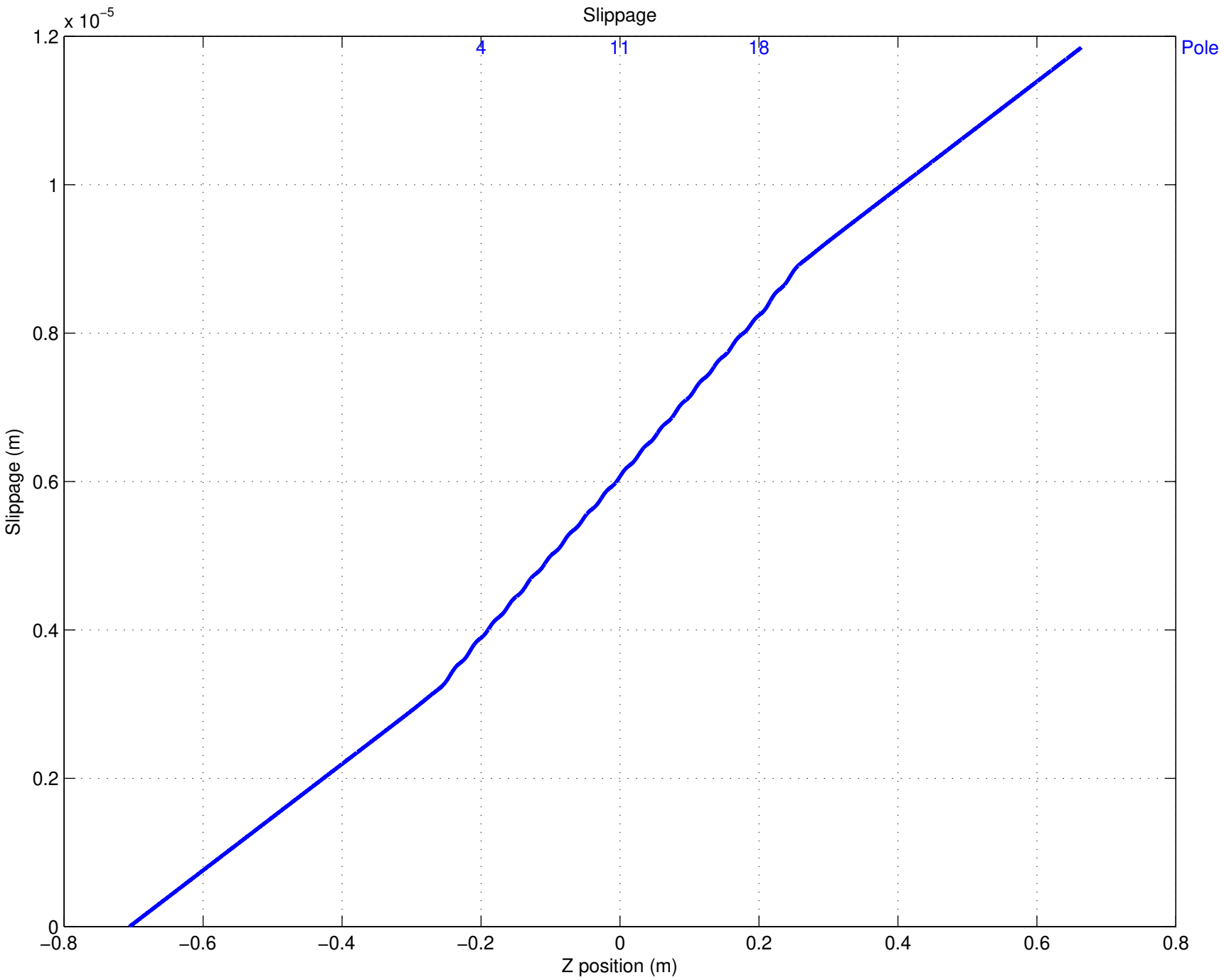

Y Trajectory
x 10^-4
Y (m)
4
11
18
Pole
x 10^-5
Y'
x 10^-3
Y'' (1/m)
Z position (m)

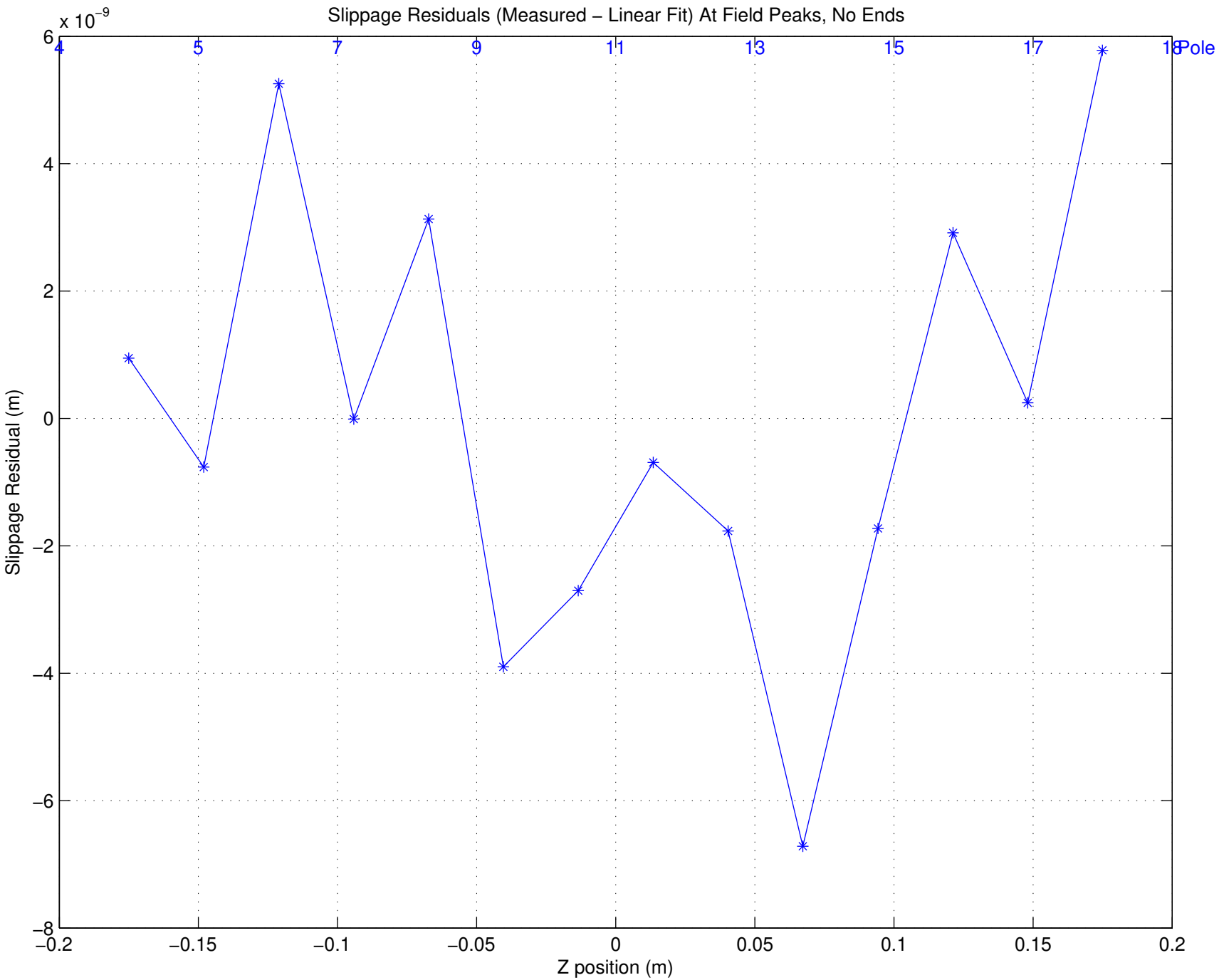

X Trajectory
x 10^-5
6
4
2
0
−2
−4
−6
X (m)
4
11
18
Pole
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)

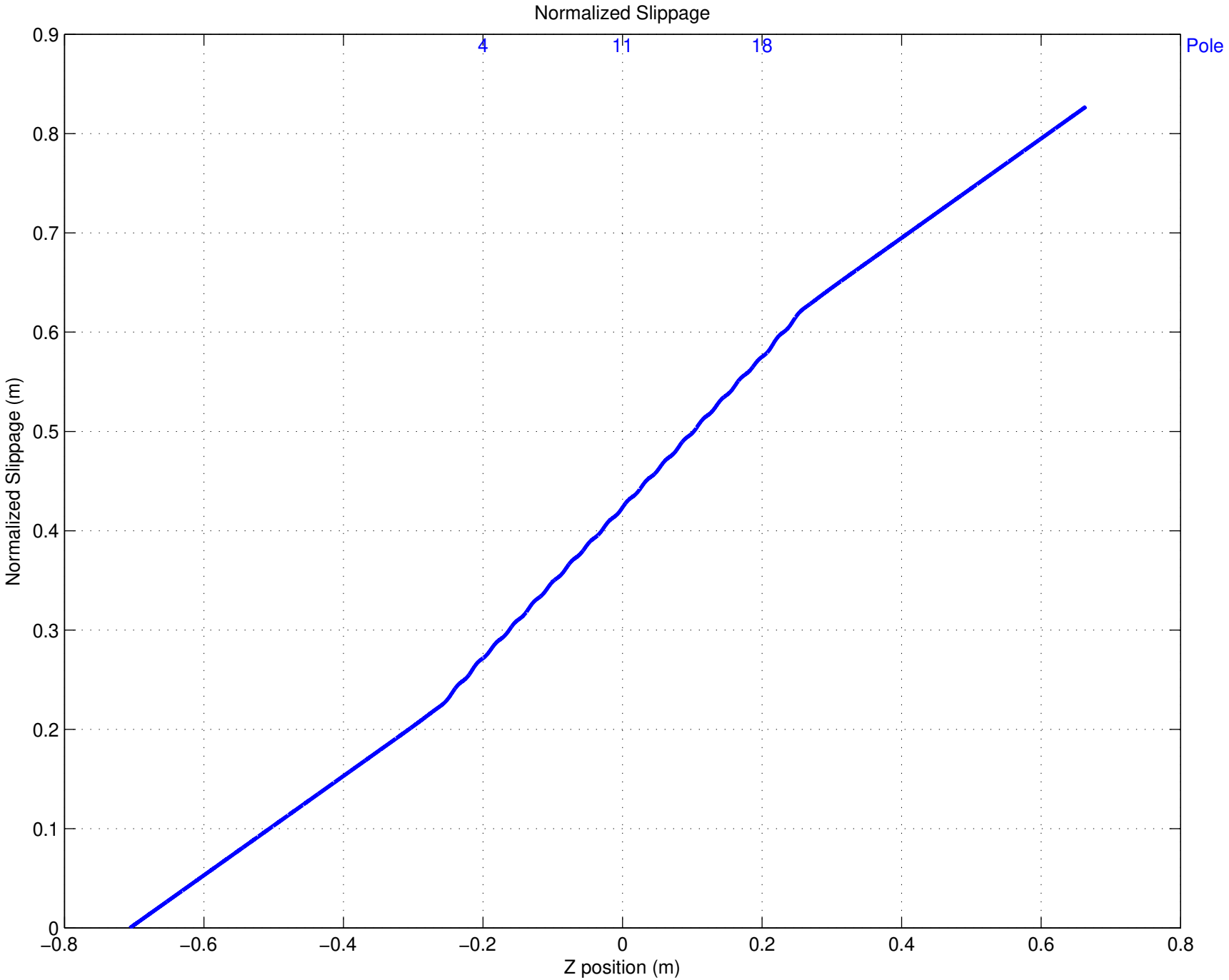

Y Trajectory
x 10^-5
9
8
7
6
5
4
3
2
1
0
4
11
18
Pole
Y (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)

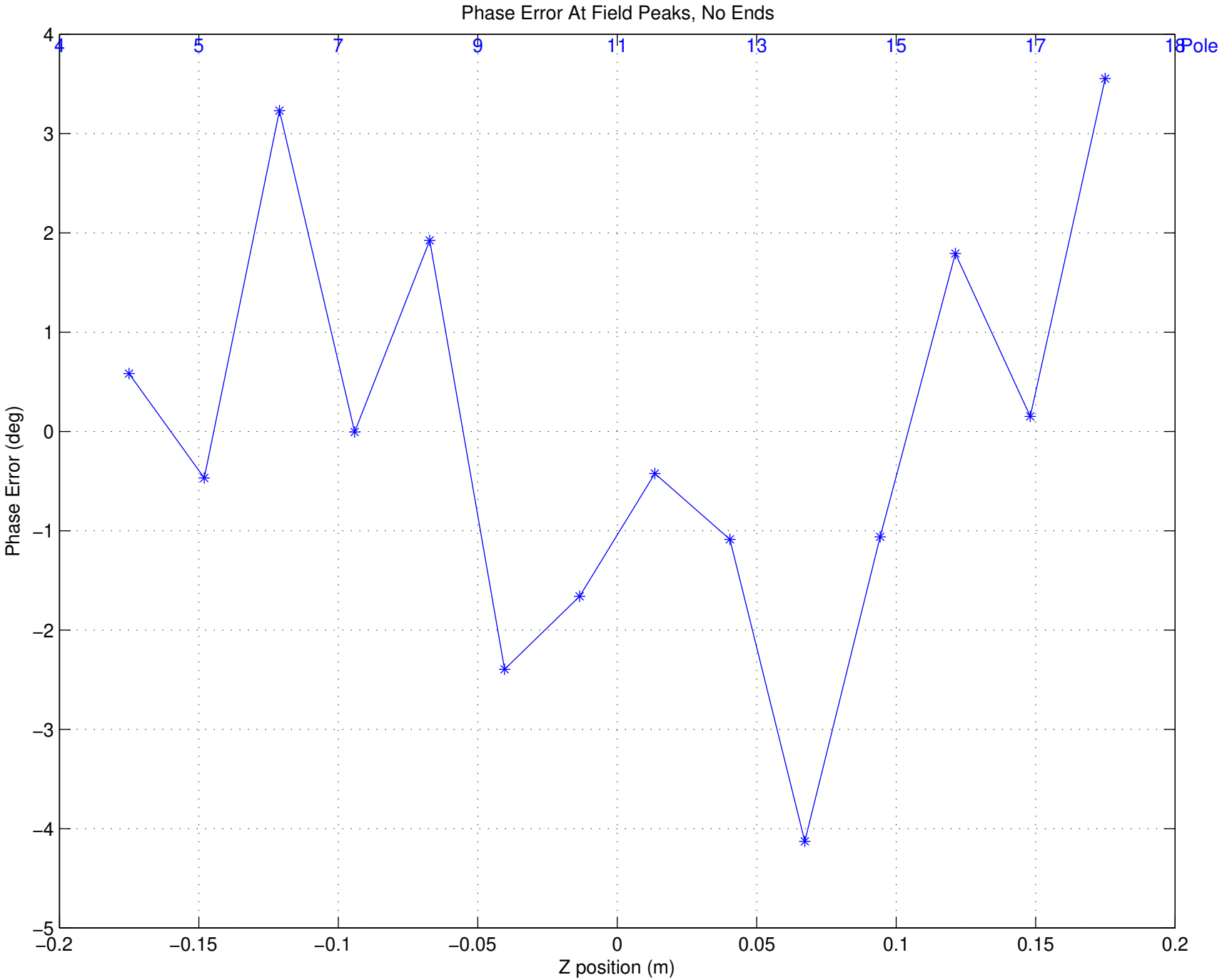

X Trajectory, Slope Corrected
x 10^-5
8
6
4
2
0
−2
−4
4
11
18
Pole
X Trajectory, Corrected (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)


Y Trajectory, Slope Corrected
x 10^-5
0
−0.5
−1
−1.5
−2
−2.5
−3
4
11
18
Pole
Y Trajectory, Corrected (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)

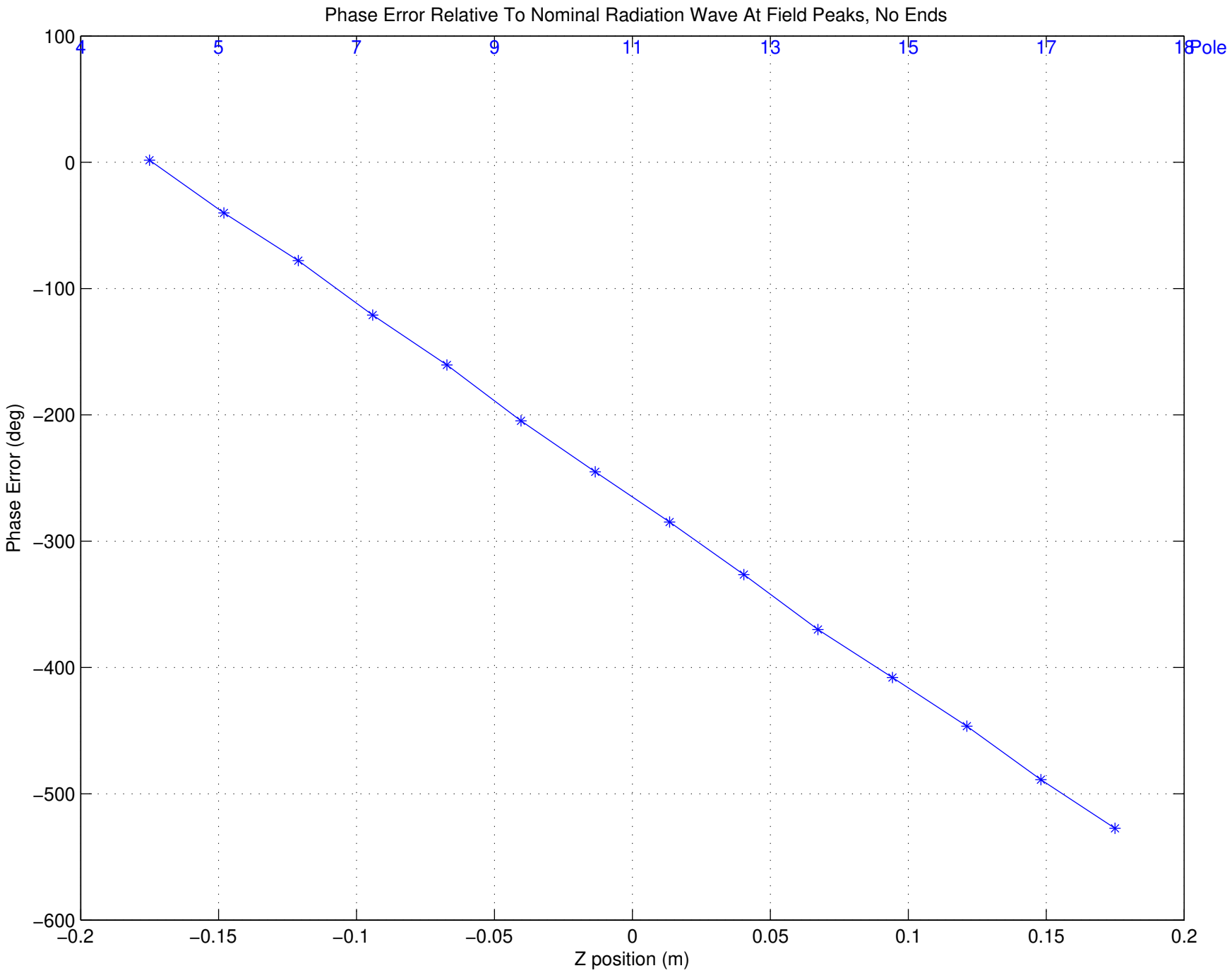

Slippage
x 10^-5
1.2
1
0.8
0.6
0.4
0.2
0
Slippage (m)
4
11
18
Pole
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z position (m)


Slippage Residuals (Measured – Linear Fit) At Field Peaks, No Ends
x 10^-9
Slippage Residual (m)
Z position (m)
Pole
4
5
7
9
11
13
15
17
18
6
4
2
0
−2
−4
−6
−8
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2


Normalized Slippage
4
11
18
Pole
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Normalized Slippage (m)
−0.8
−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 = 2.123091 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
Pole
4
5
7
9
11
13
15
17
18
100
0
−100
−200
−300
−400
−500
−600
Phase Error (deg)
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
Z position (m)