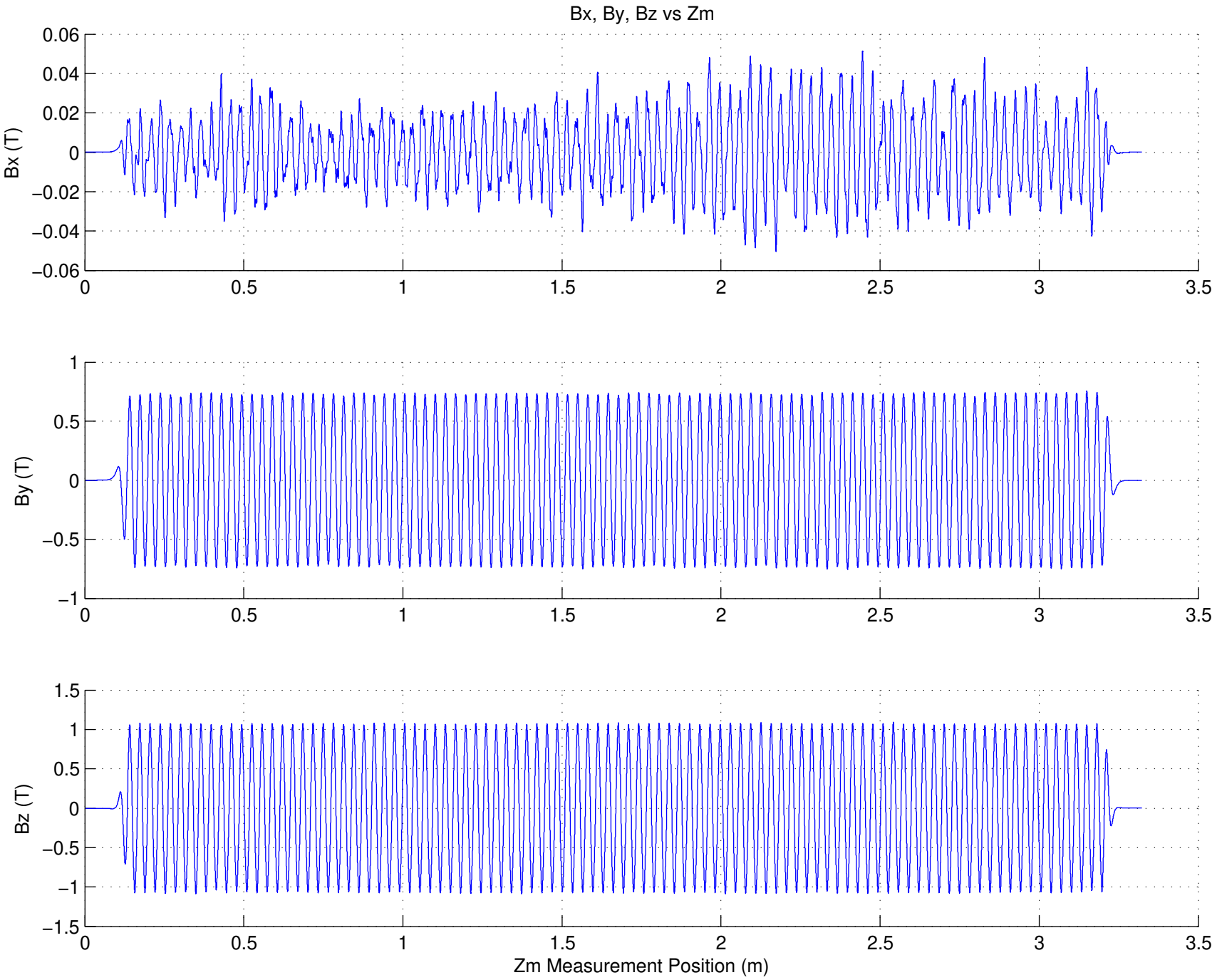
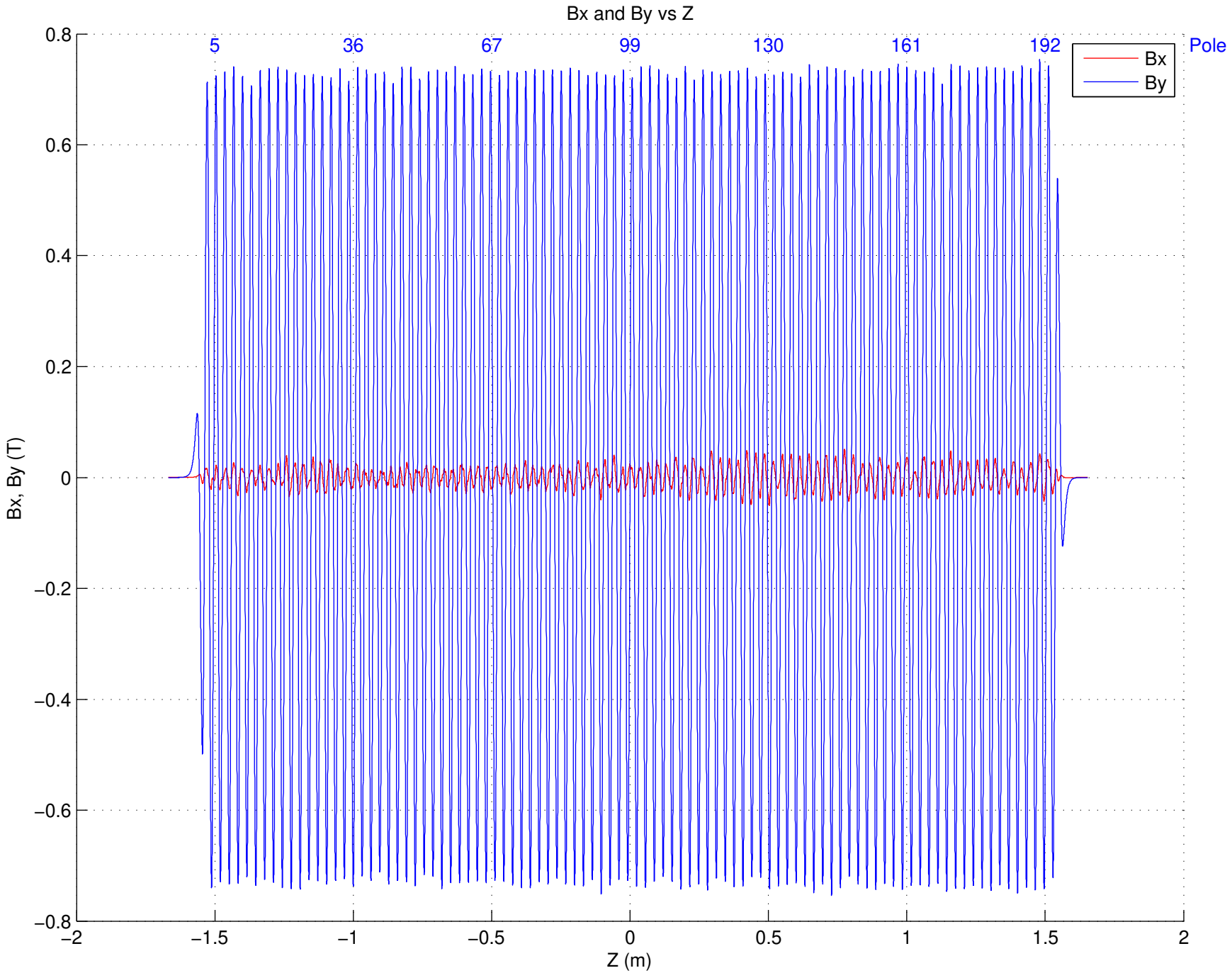
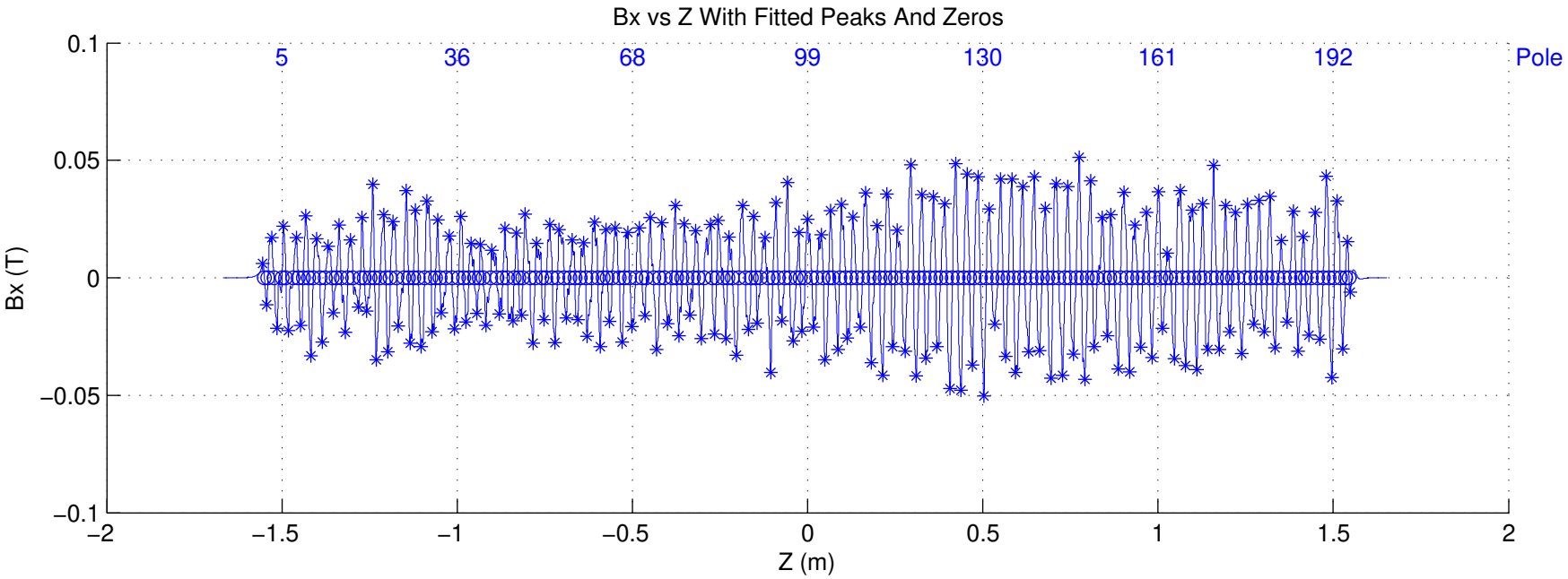
SLAC Magnetic Measurements

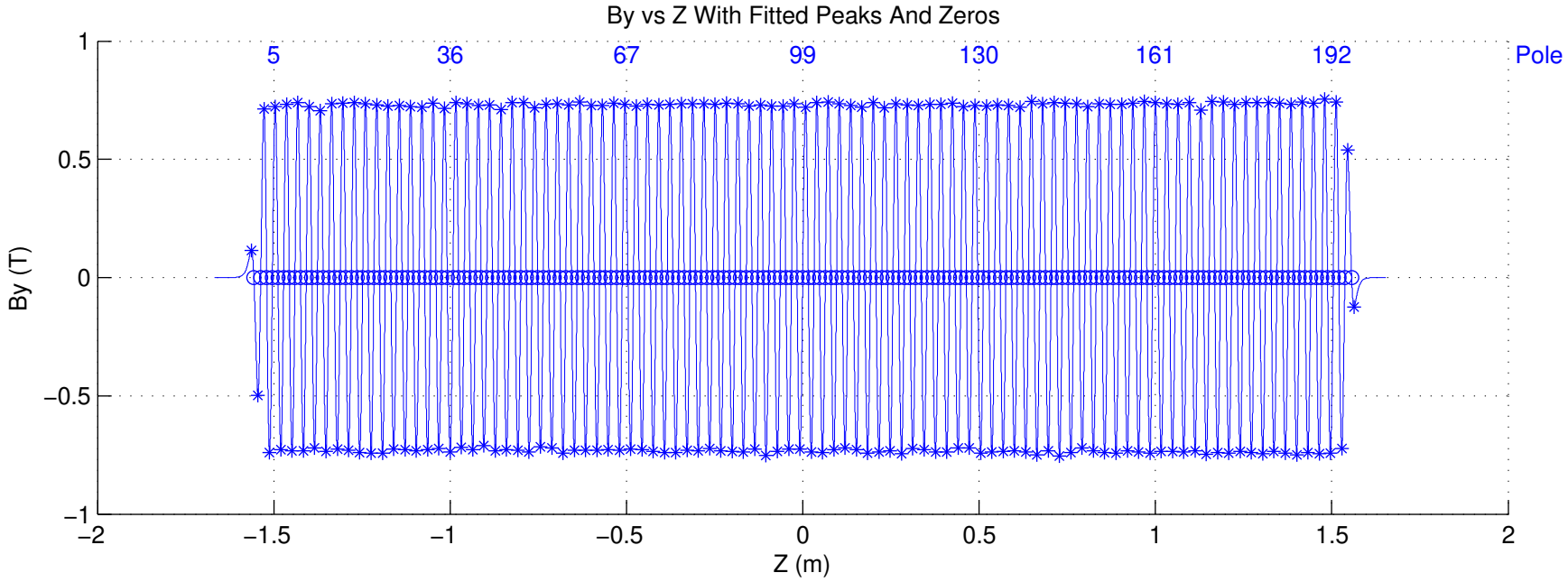
EPU Analysis
−−−−−−−−−−−

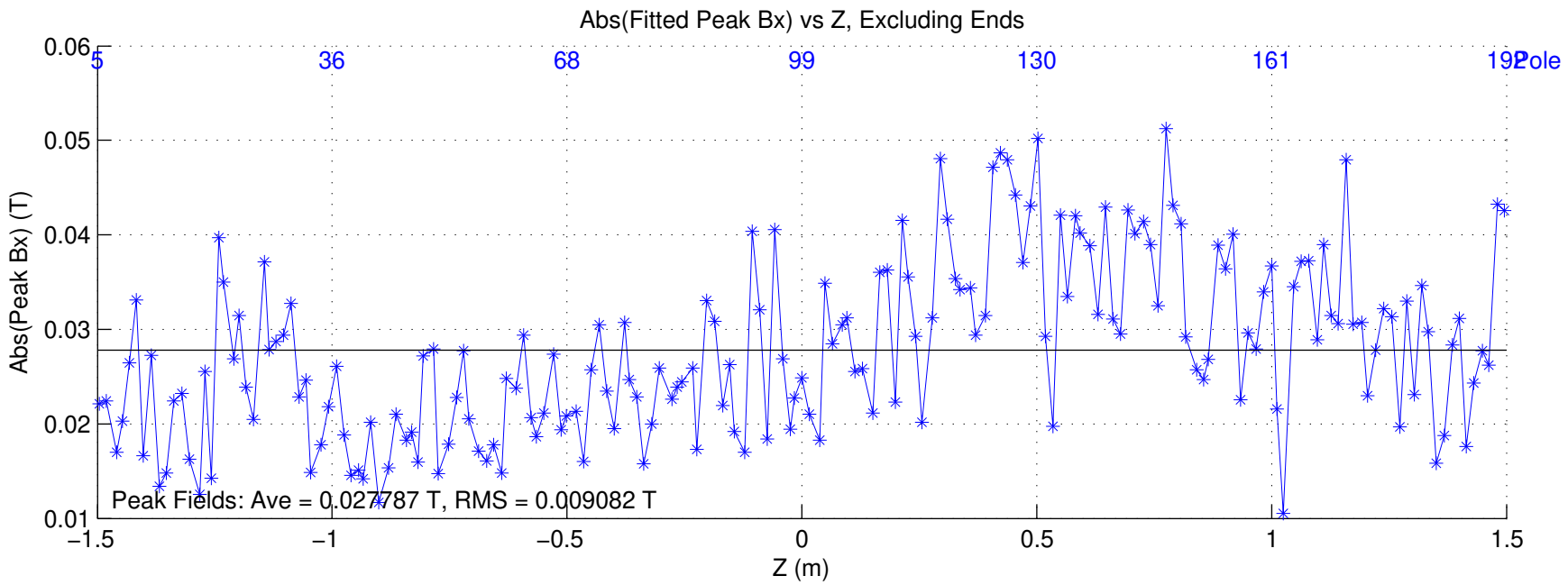
Parameters:
INPUT−FILE−DIR =V:\MET\MagServe\MagData\DELTA\Delta data\Assembled Measurements\Final Measurements\LPVMF\KR0
INPUT−FILE−NAME =hall2−anal−probe2−field.dat
INPUT−FILE−TYPE =ZBXYZH
CORR−REQUIRED =0
GAMMA =26671.59
NOM−LAMBDA−U =0
NOM−K−VALUE =0
NOM−LAMBDA−R =0
NUM−POLES =196
NUM−END−POLES =4
CELL−LENGTH =3.656

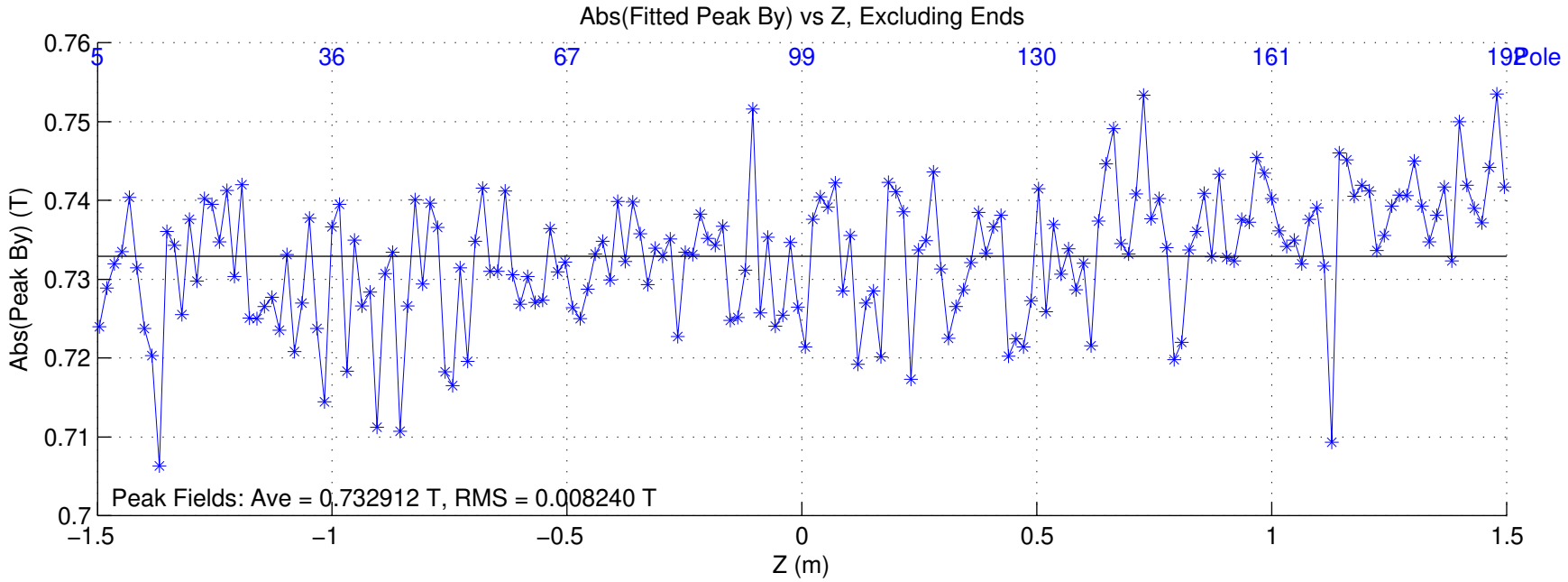

Bx, By, Bz vs Zm
Bx (T)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
By (T)
1
0.5
0
−0.5
−1
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Zm Measurement Position (m)

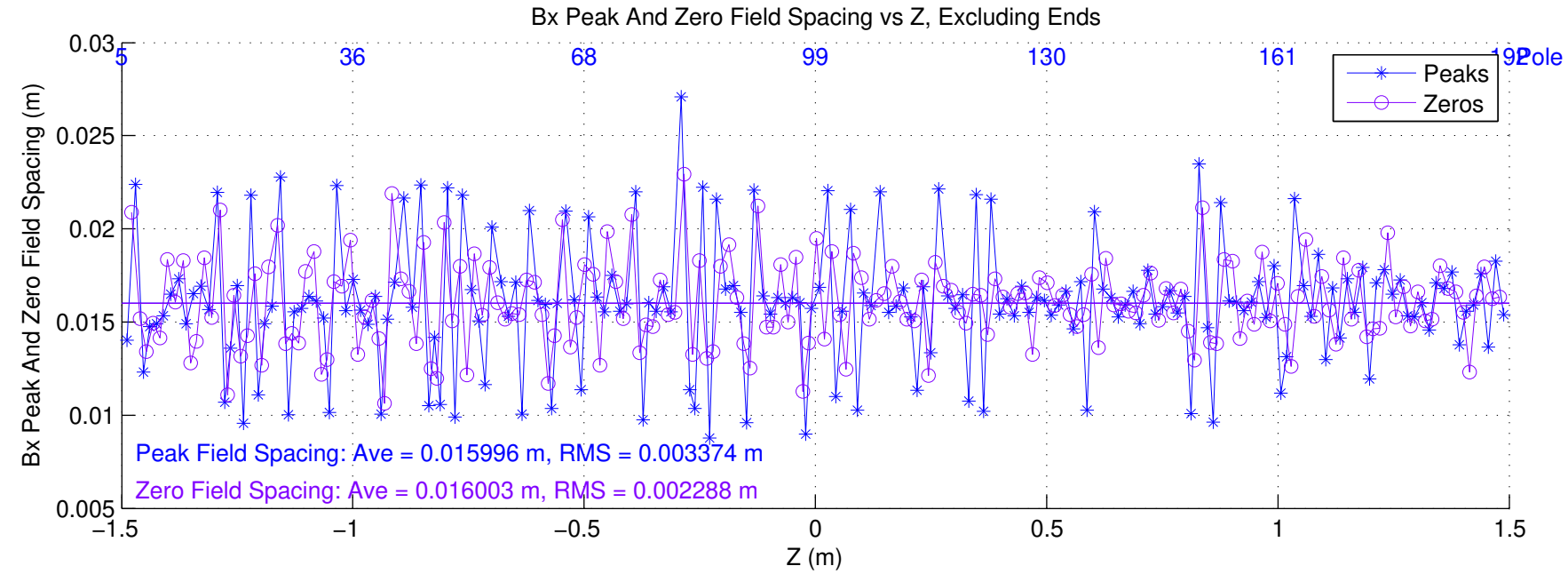

Bx and By vs Z
5
36
67
99
130
161
192
Pole
Bx
By
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
Bx, By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

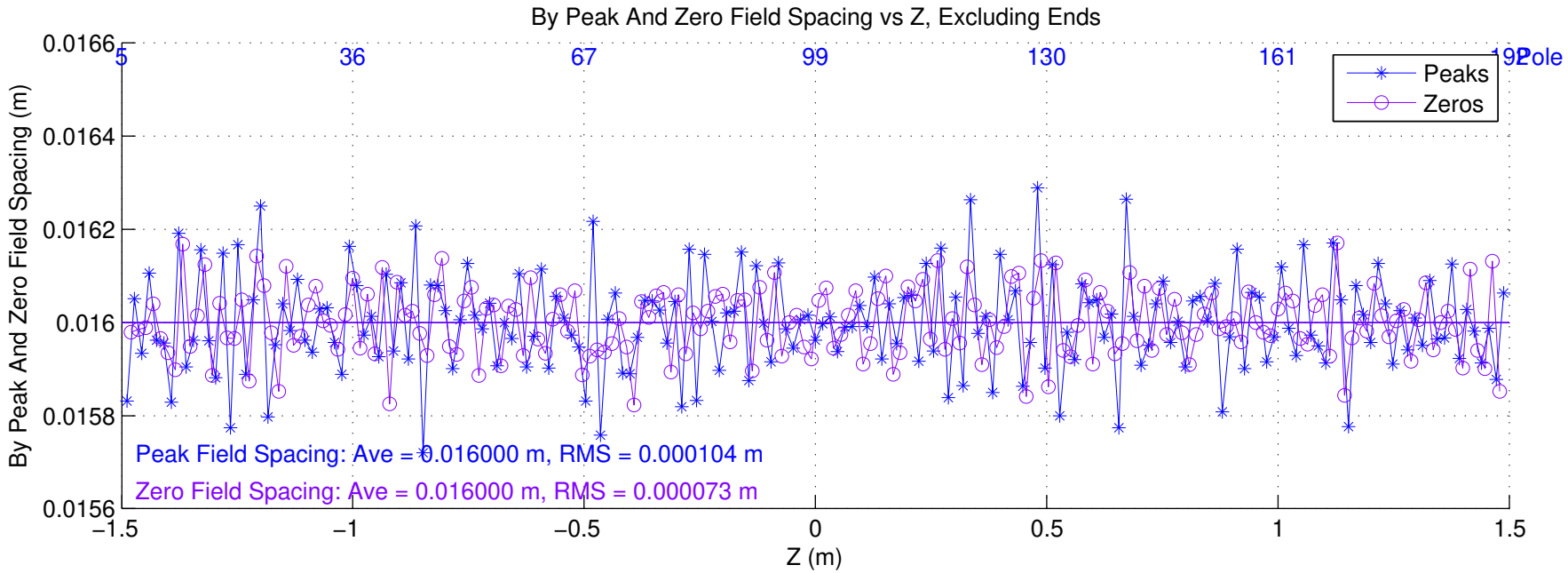

Bx vs Z With Fitted Peaks And Zeros
5
36
68
99
130
161
192
Pole
0.1
0.05
0
−0.05
−0.1
Bx (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

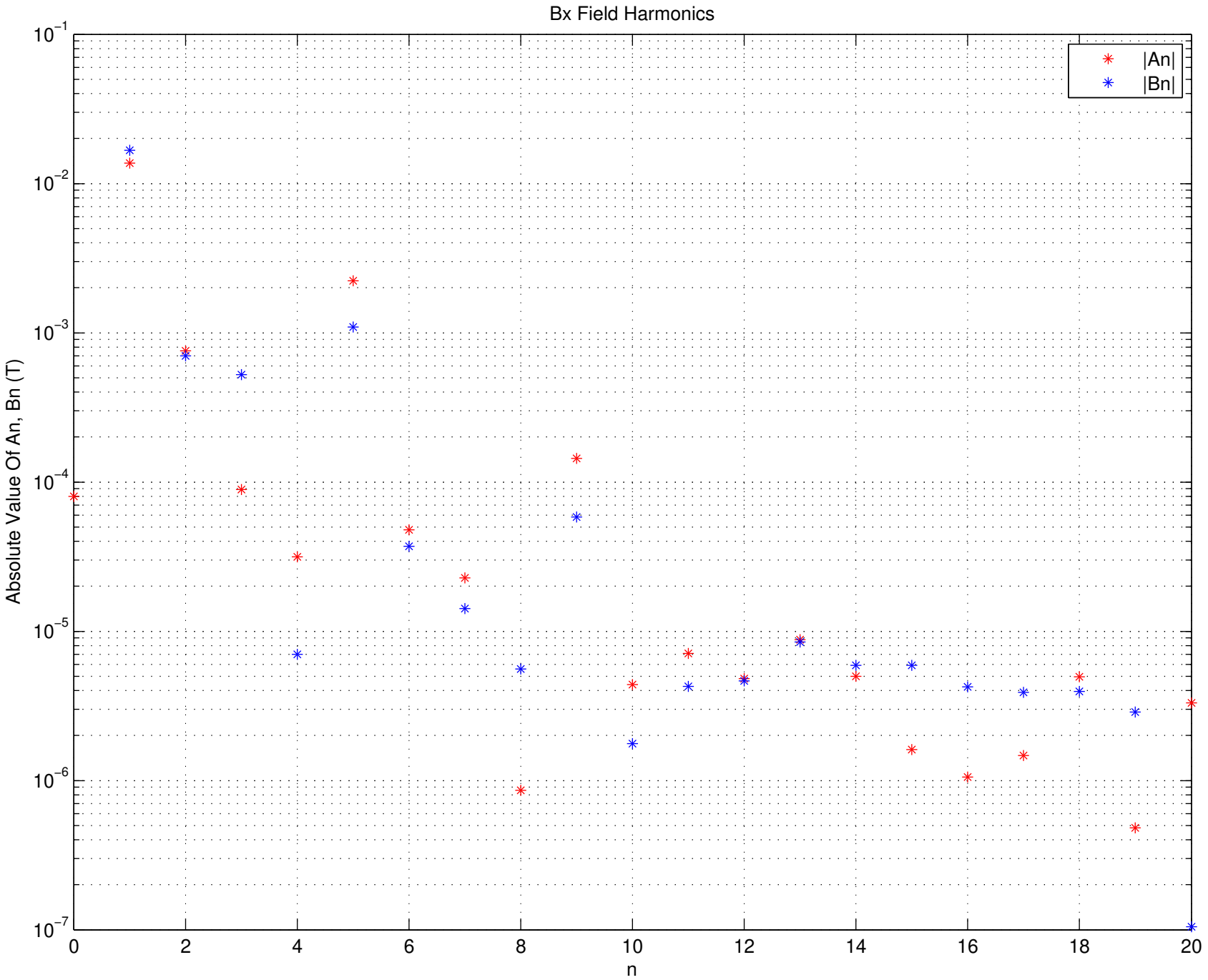

By vs Z With Fitted Peaks And Zeros
5
36
67
99
130
161
192
Pole
1
0.5
0
−0.5
−1
By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

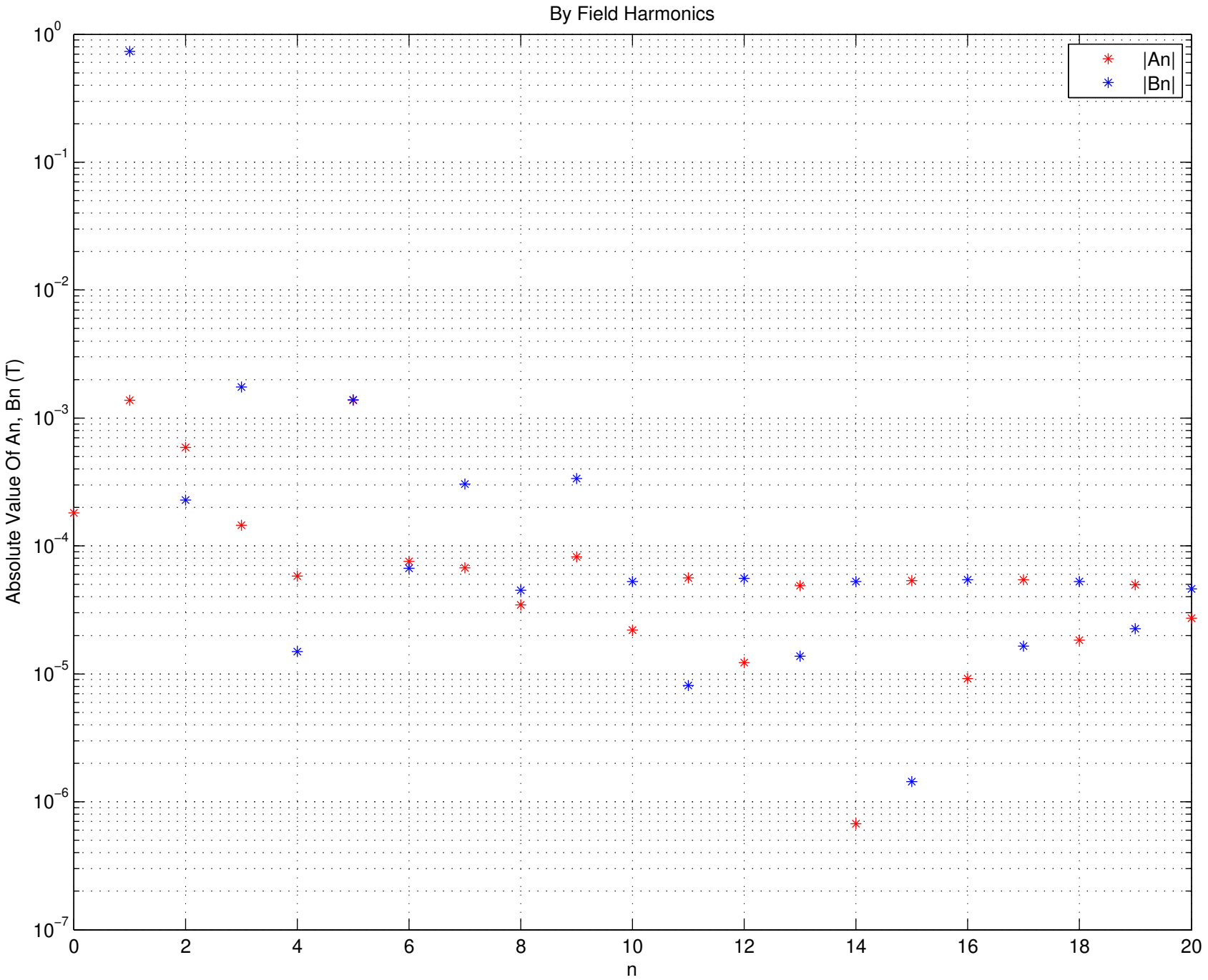

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
Z (m)
Pole
Peak Fields: Ave = 0.027787 T, RMS = 0.009082 T
0.06
0.05
0.04
0.03
0.02
0.01
5
36
68
99
130
161
192
−1.5
−1
−0.5
0
0.5
1
1.5

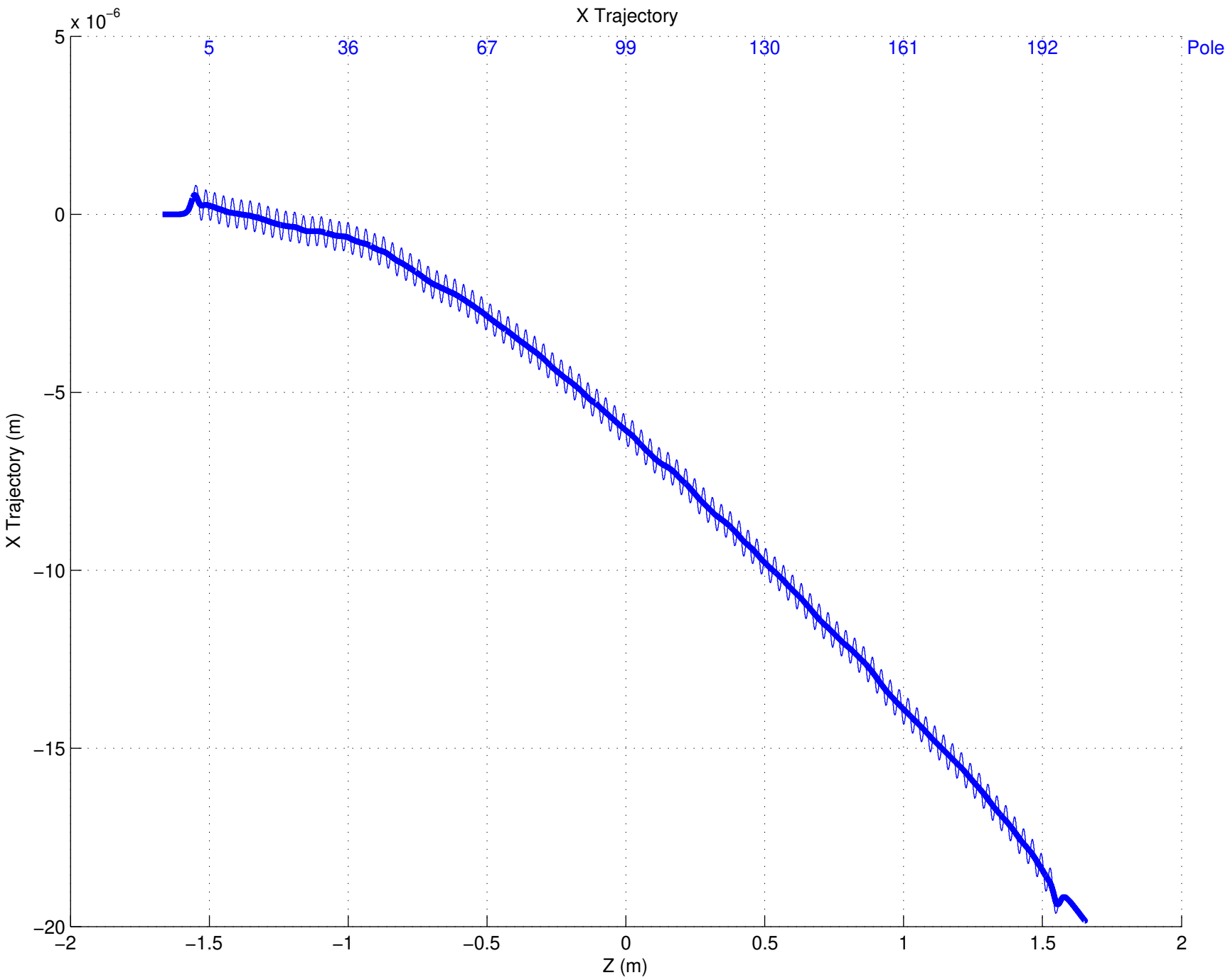

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
Z (m)
Pole
Peak Fields: Ave = 0.732912 T, RMS = 0.008240 T
0.76
0.75
0.74
0.73
0.72
0.71
0.7
5
36
67
99
130
161
192
−1.5
−1
−0.5
0
0.5
1
1.5

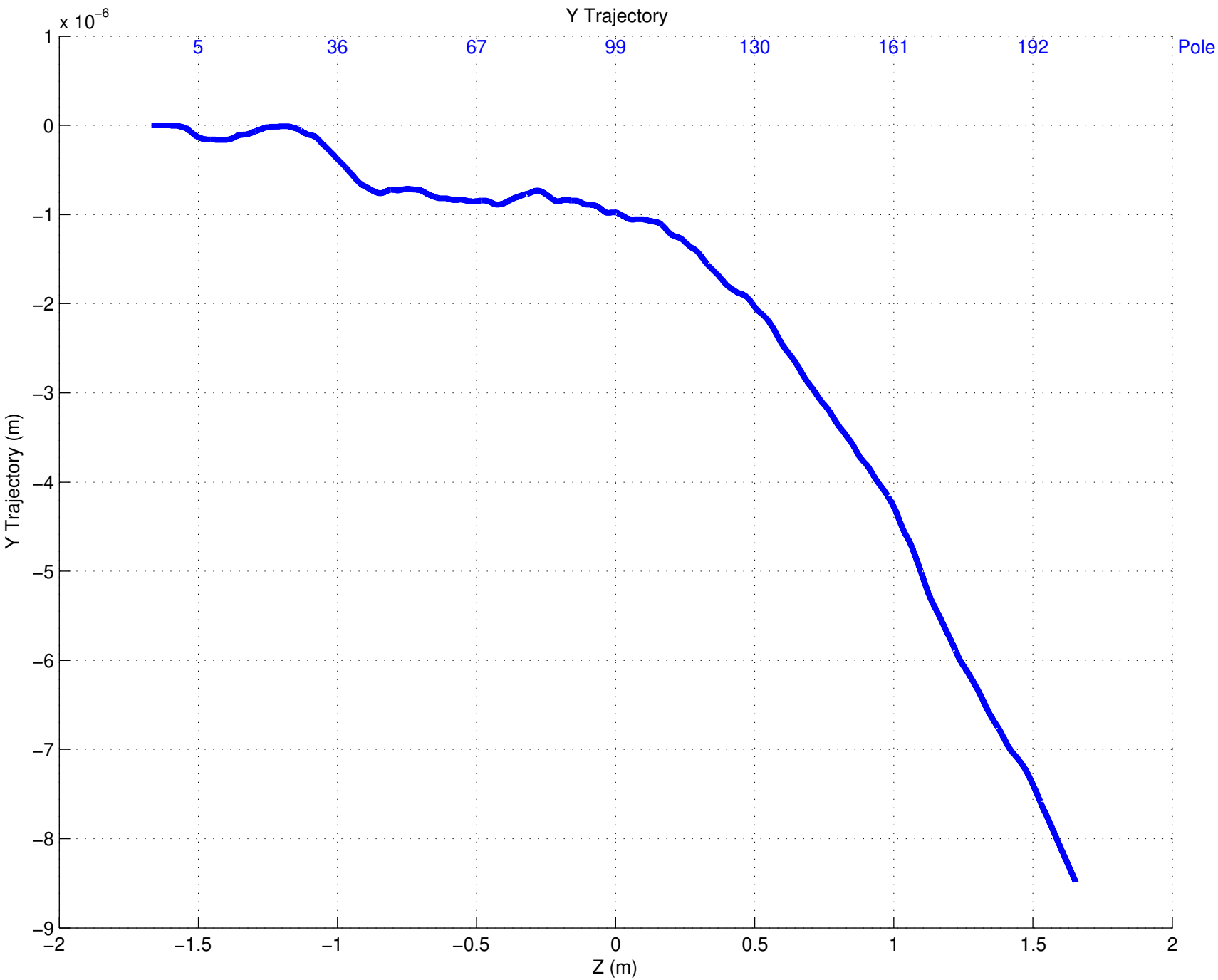

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
5
36
68
99
130
161
192
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.015996 m, RMS = 0.003374 m
Zero Field Spacing: Ave = 0.016003 m, RMS = 0.002288 m

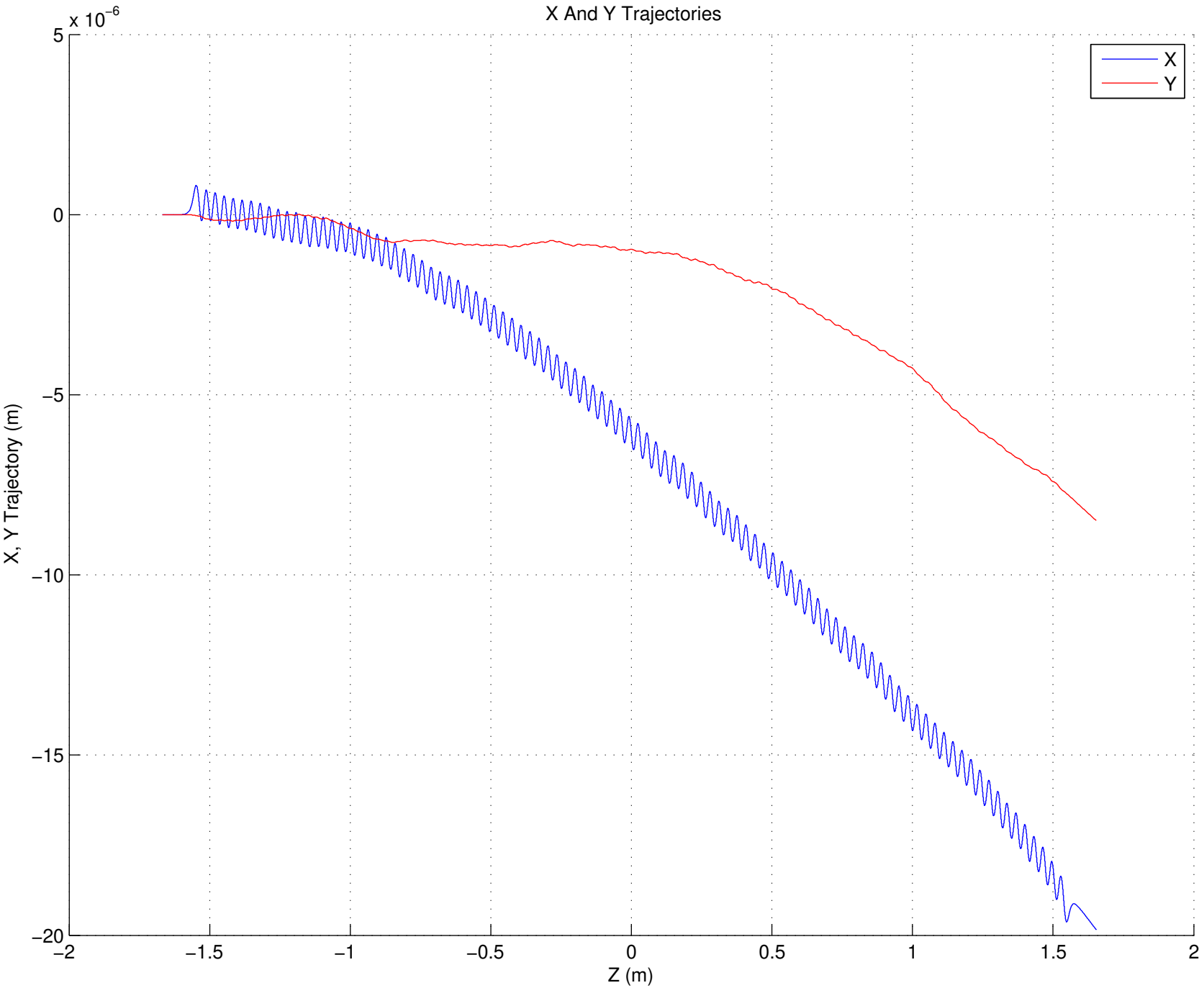

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
5
36
67
99
130
161
192
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000104 m
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000073 m

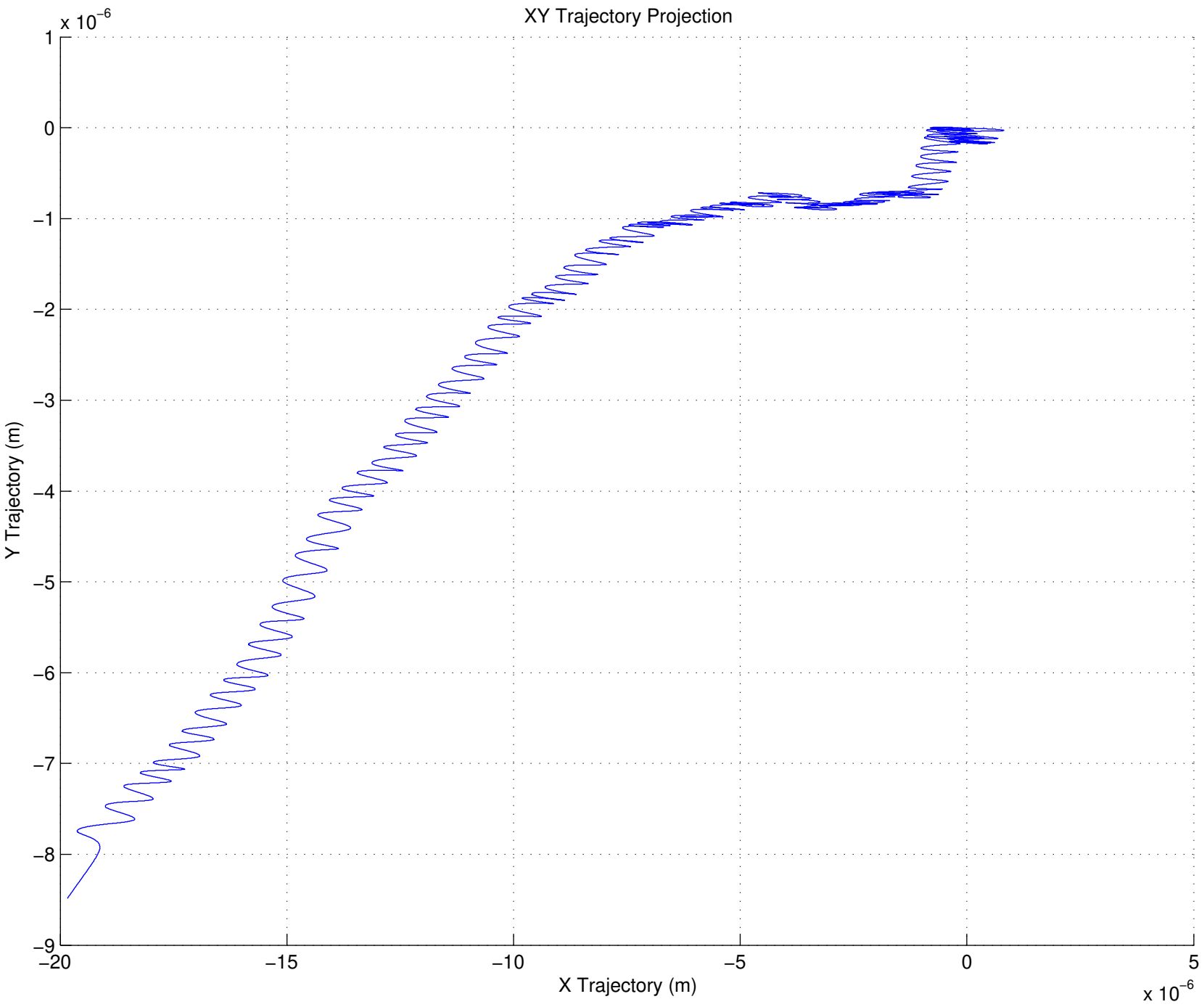

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

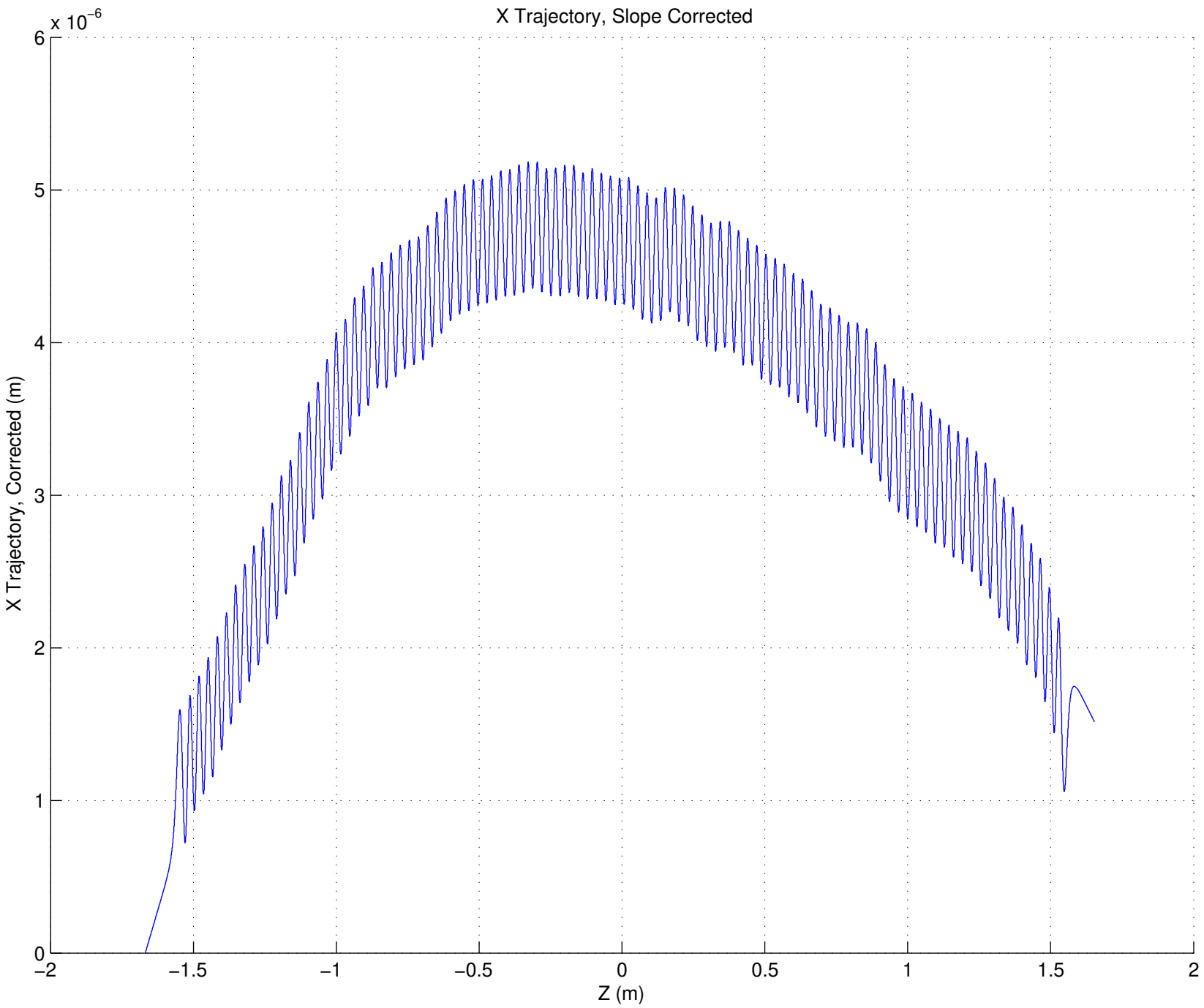

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

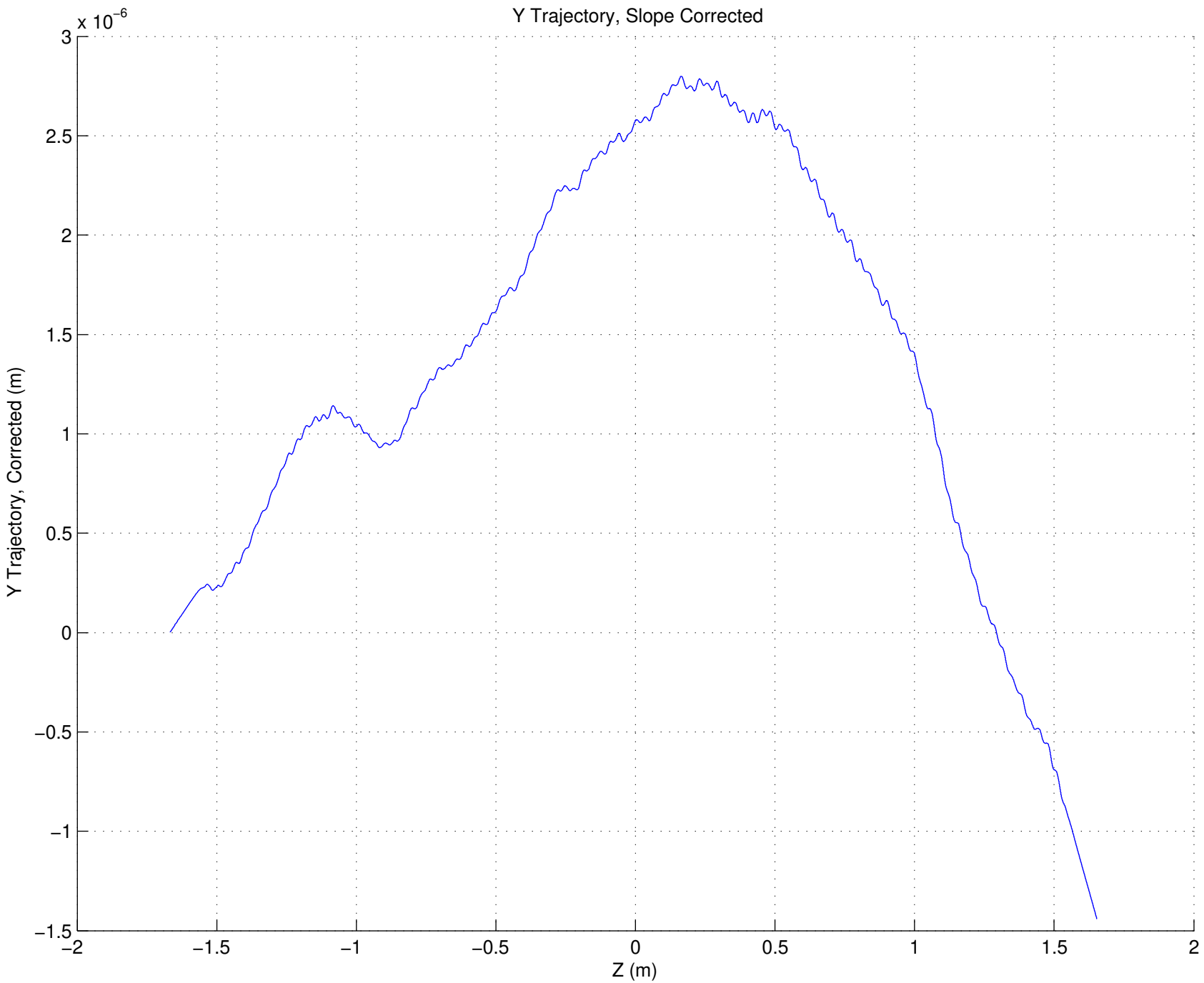

X Trajectory
x 10^-6
5
0
−5
−10
−15
−20
X Trajectory (m)
5
36
67
99
130
161
192
Pole
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

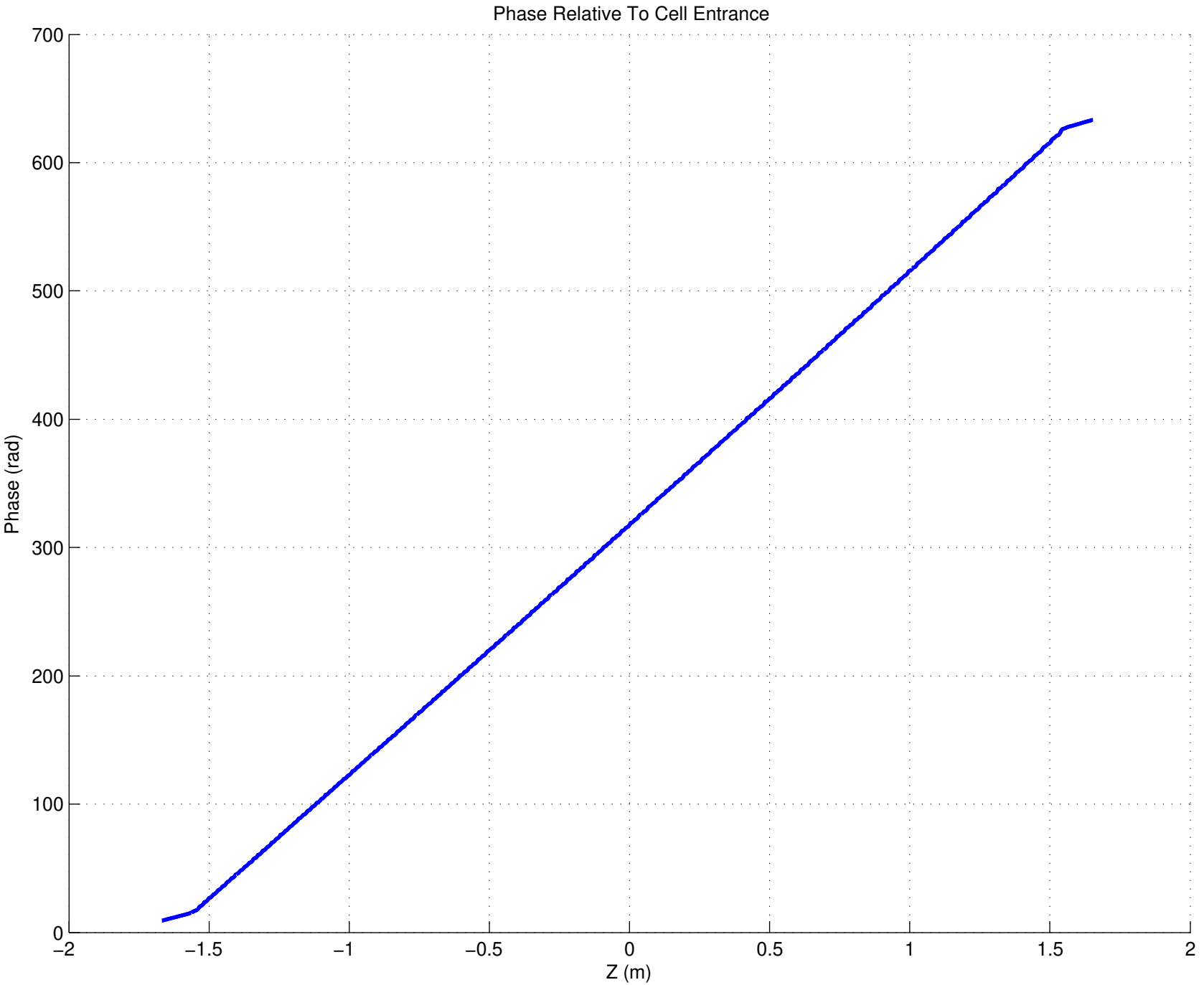

Y Trajectory
x 10^-6
5
36
67
99
130
161
192
Pole
1
0
−1
−2
−3
−4
−5
−6
−7
−8
−9
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

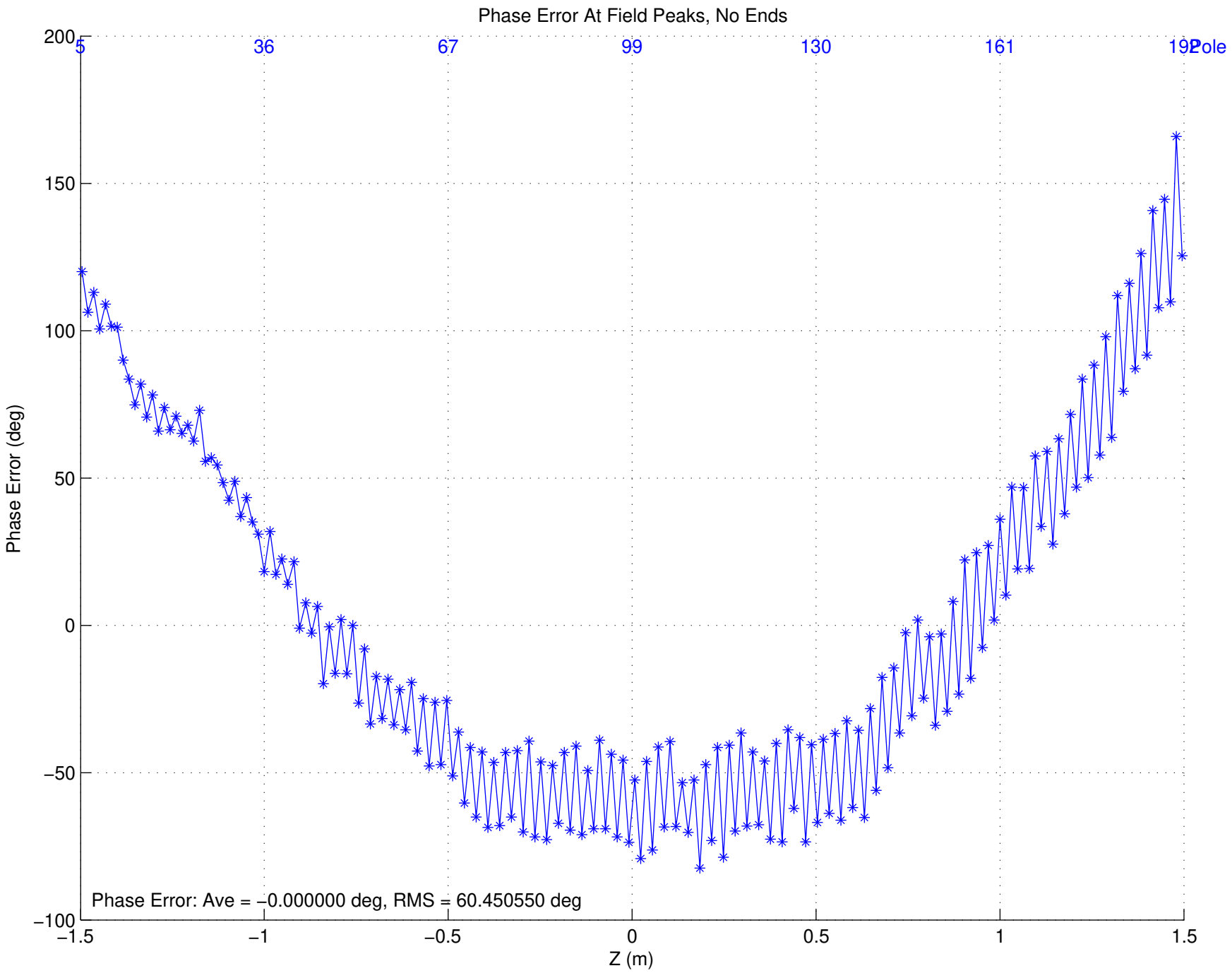

X And Y Trajectories
x 10^-6
5
0
−5
−10
−15
−20
X, Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)
X
Y

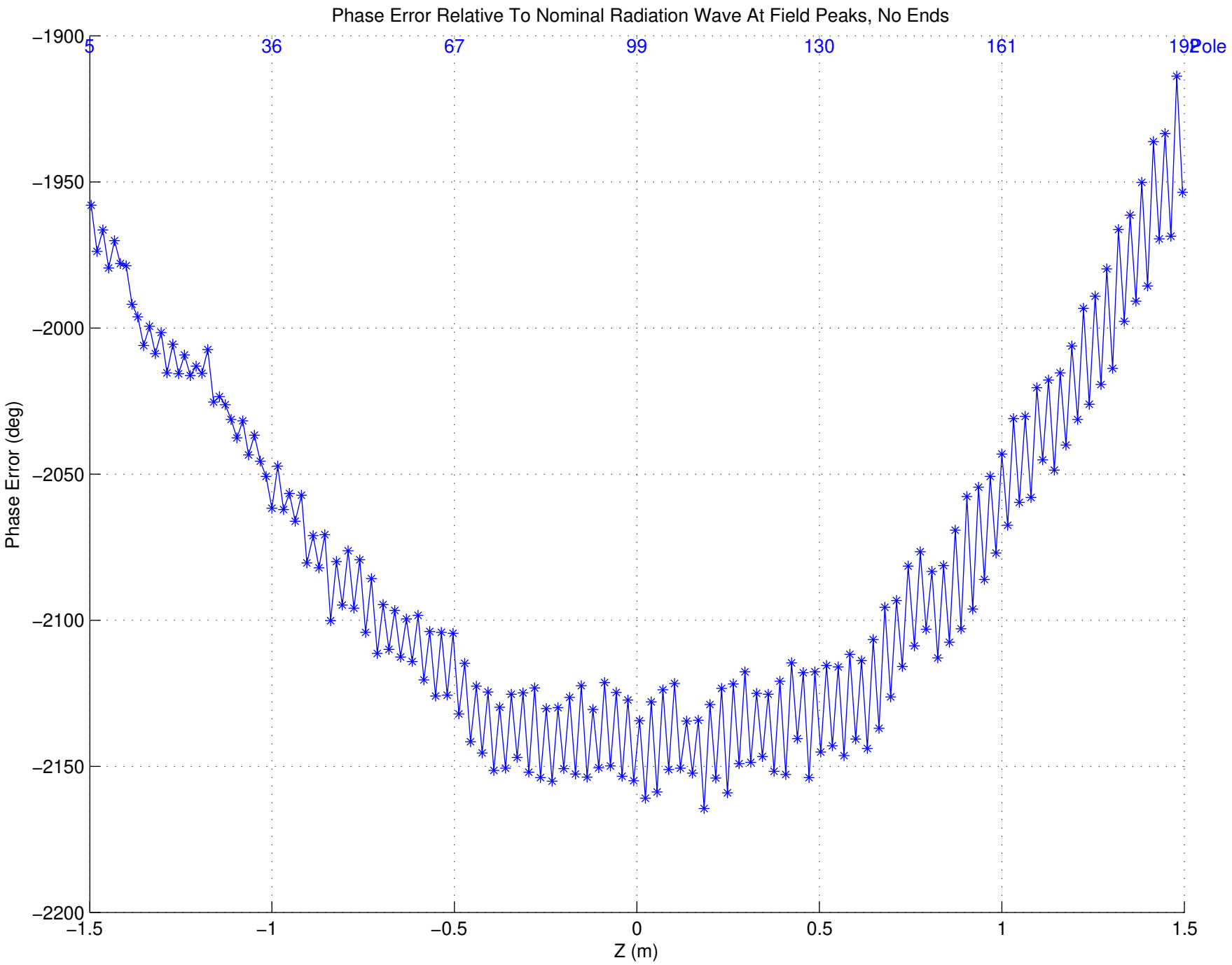

XY Trajectory Projection
x 10^-6
1
0
−1
−2
−3
−4
−5
−6
−7
−8
−9
Y Trajectory (m)
−20
−15
−10
−5
0
5
X Trajectory (m)
x 10^-6

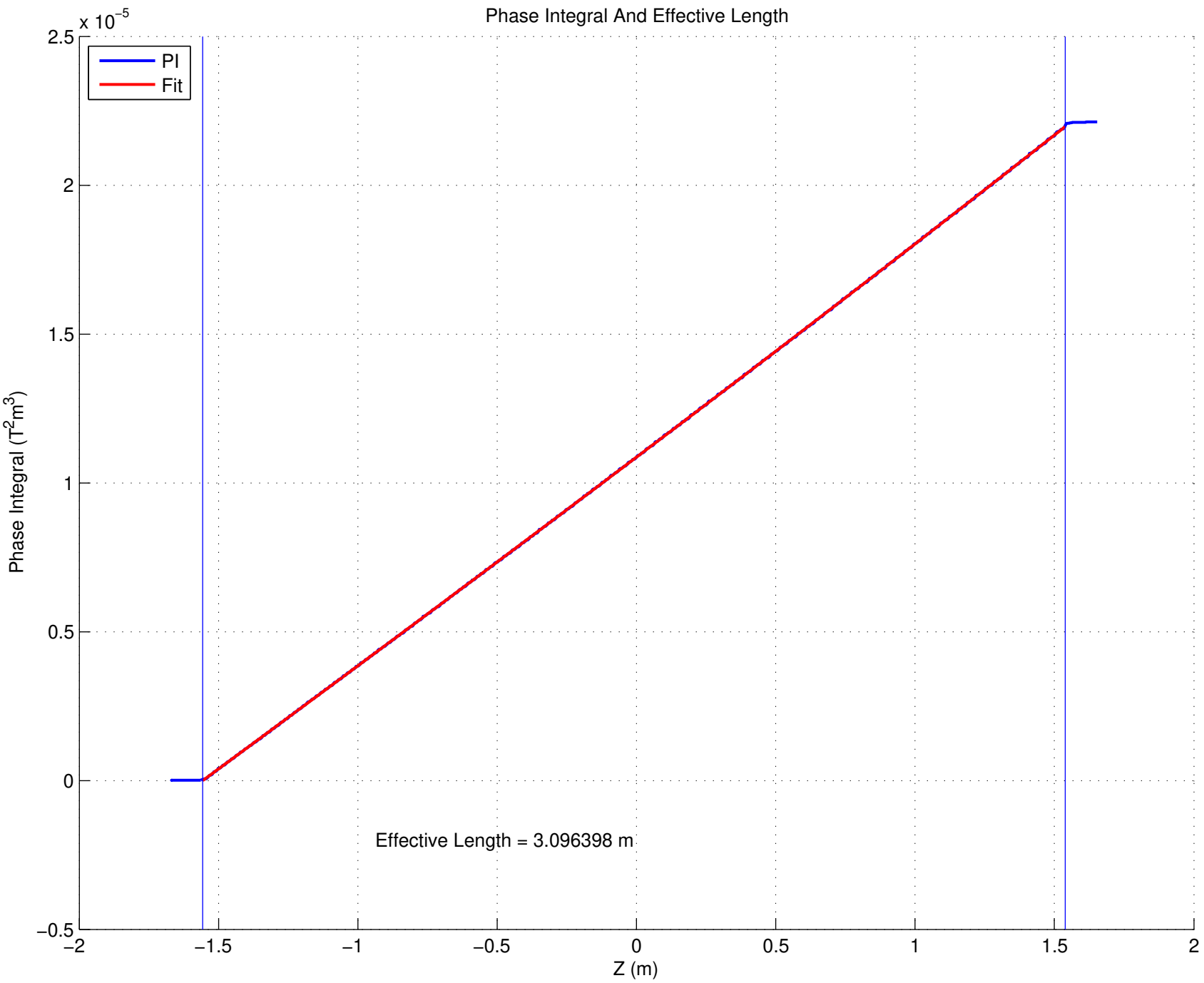

X Trajectory, Slope Corrected
x 10^-6
6
5
4
3
2
1
0
X Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

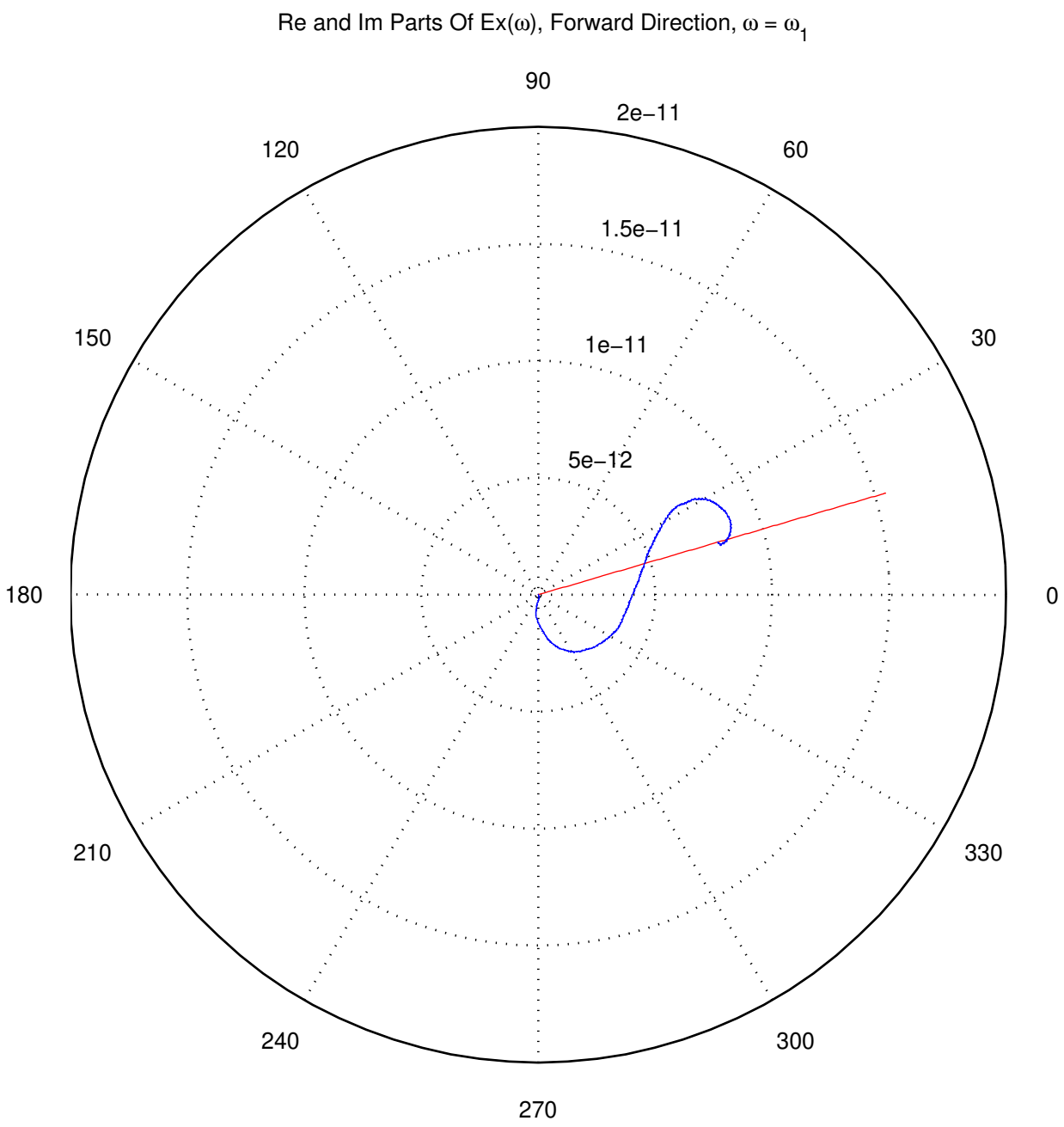

Y Trajectory, Slope Corrected
x 10^-6
3
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Y Trajectory, Corrected (m)
Z (m)

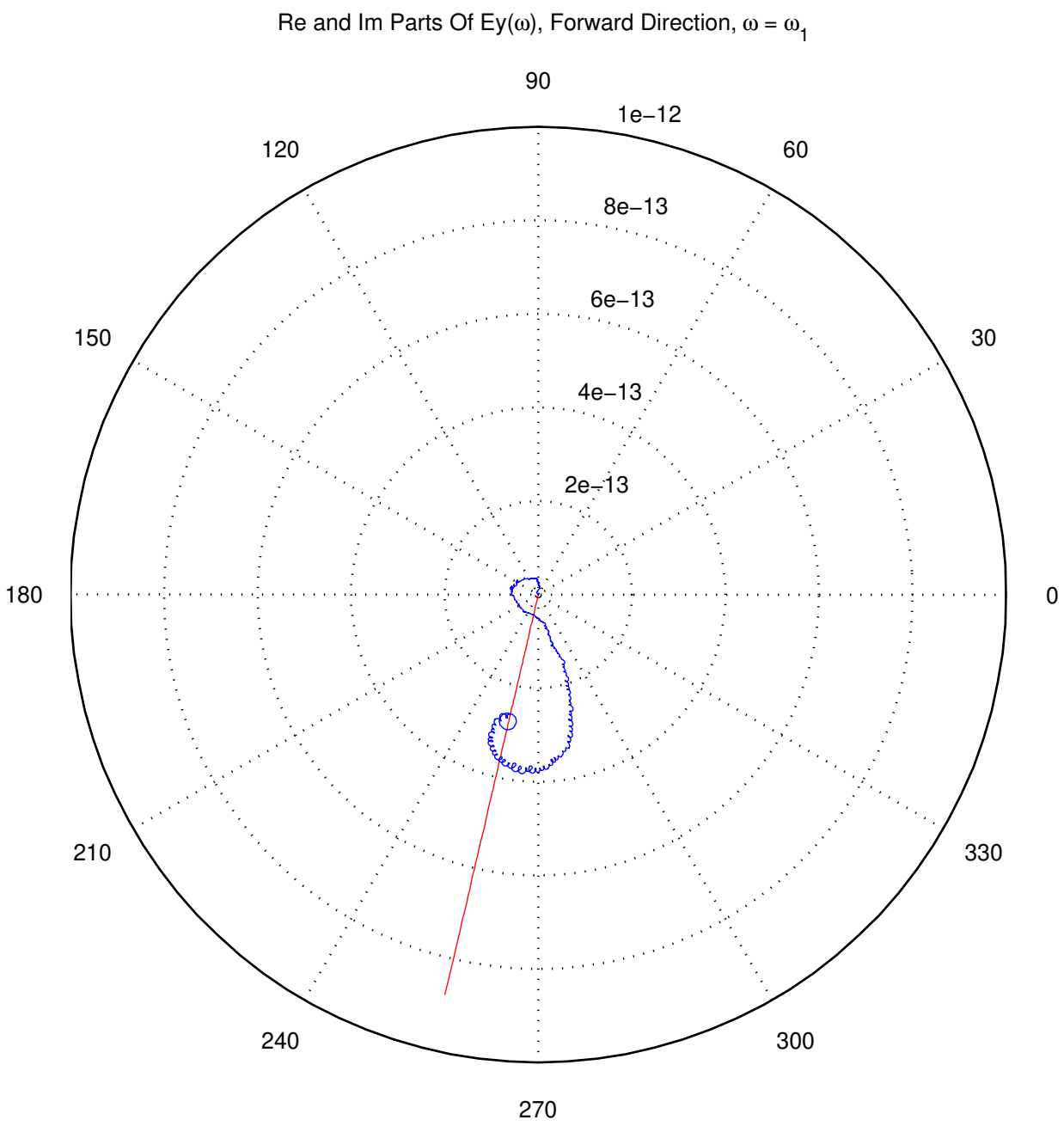

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

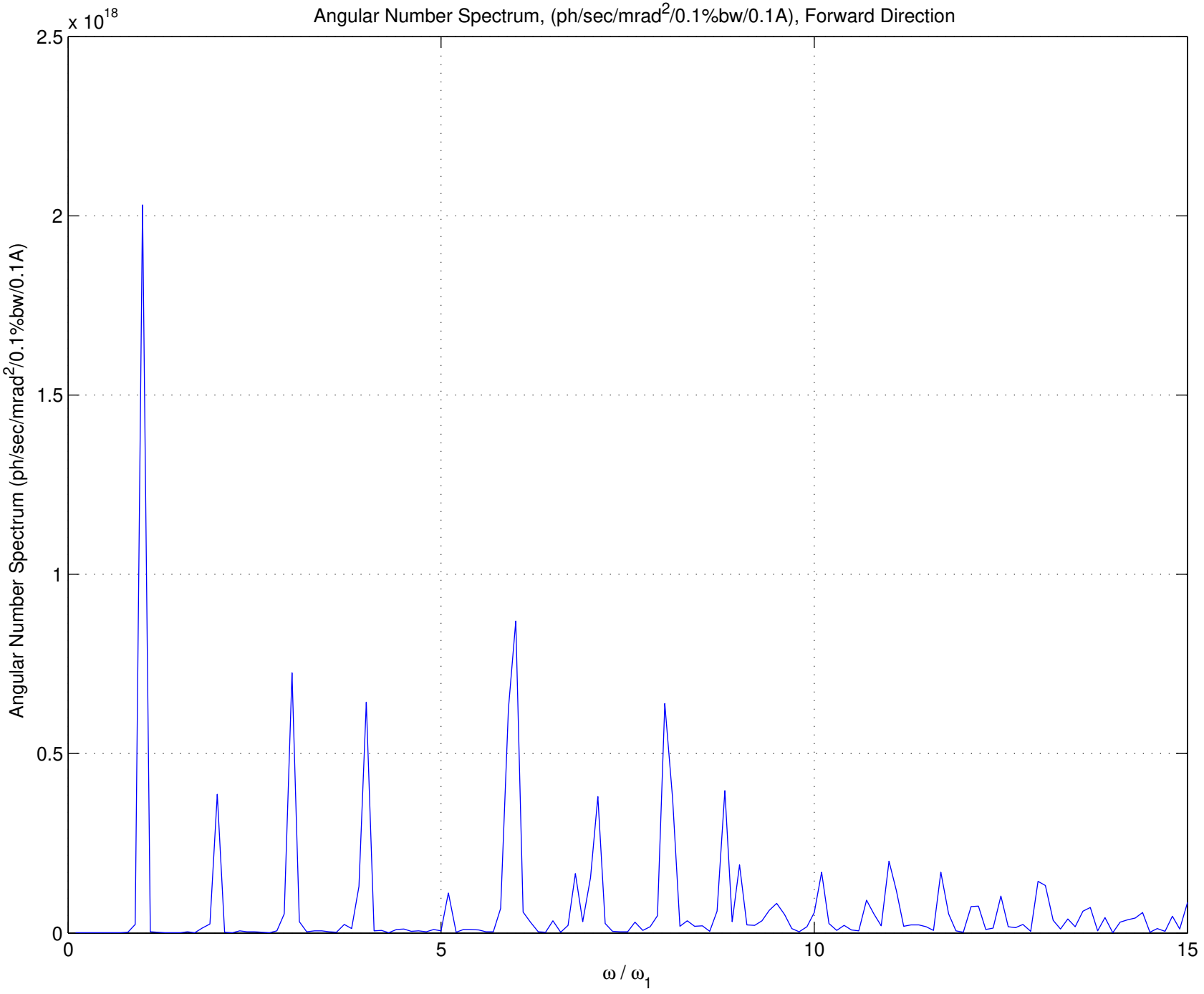

Phase Error At Field Peaks, No Ends
5
36
67
99
130
161
192
Pole
200
150
100
50
0
−50
−100
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = −0.000000 deg, RMS = 60.450550 deg

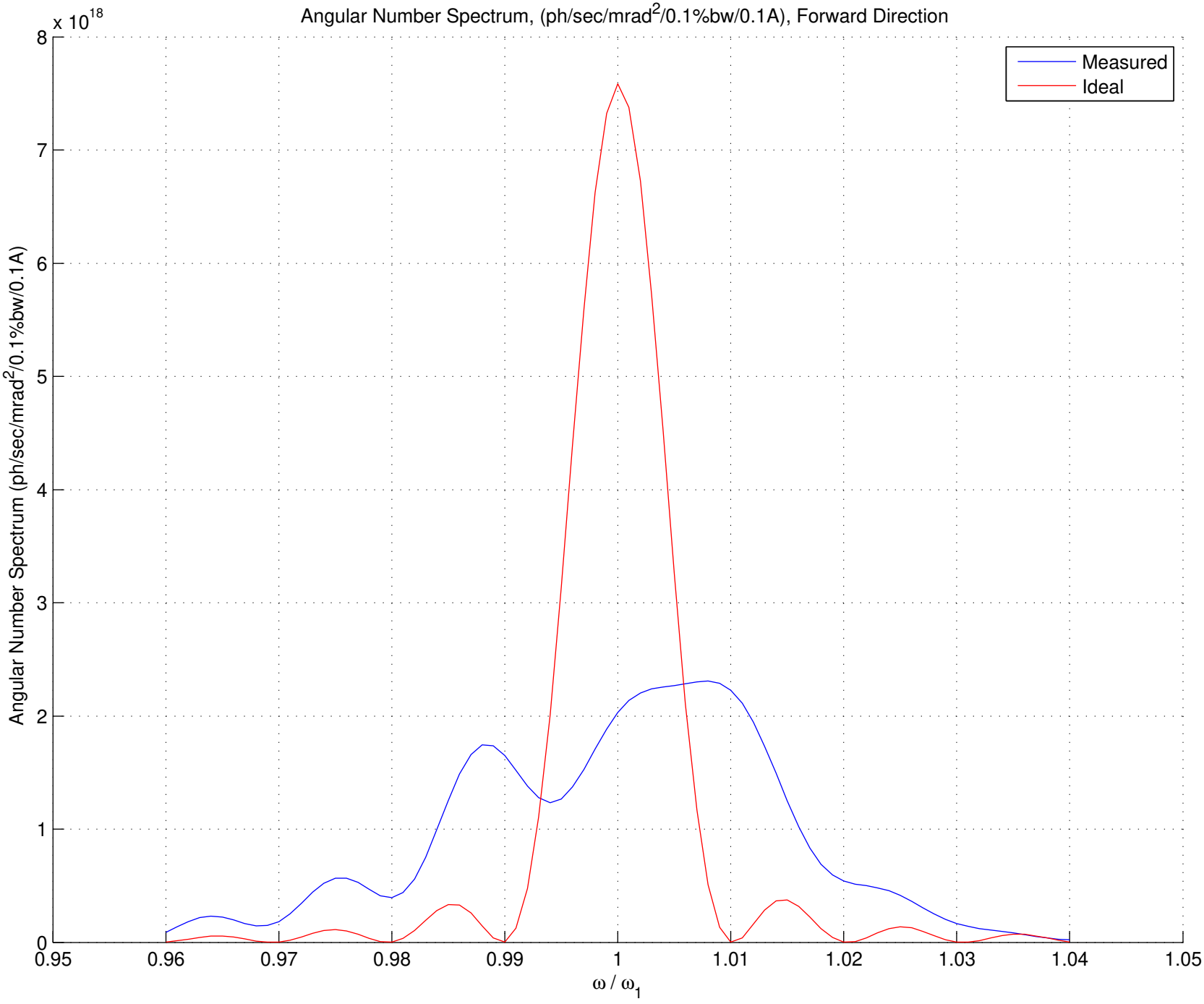

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
5
36
67
99
130
161
192
Pole
−1900
−1950
−2000
−2050
−2100
−2150
−2200
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

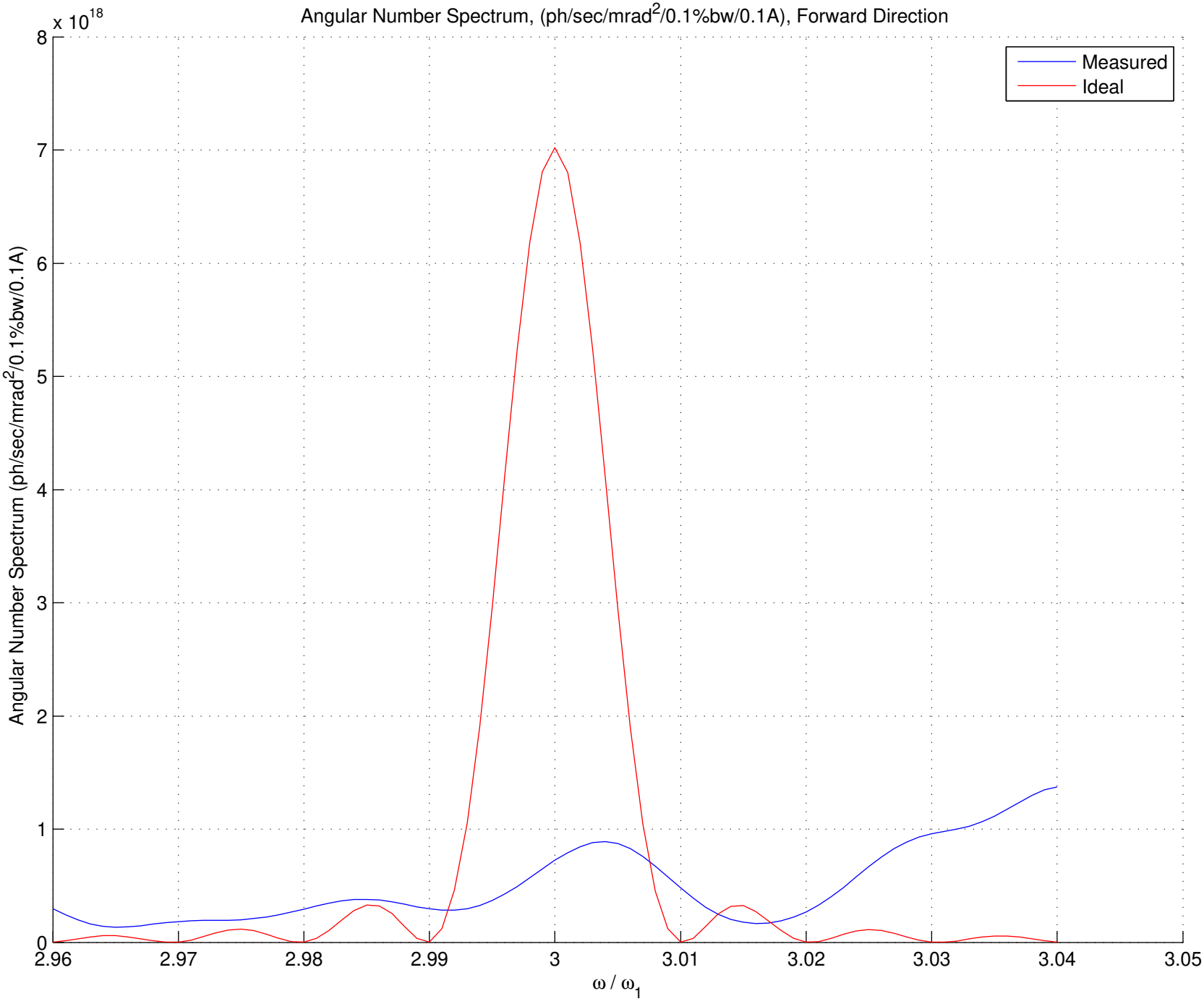

Phase Integral And Effective Length
x 10^-5
PI
Fit
2.5
2
1.5
1
0.5
0
−0.5
Phase Integral (T^2m^3)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)
Effective Length = 3.096398 m

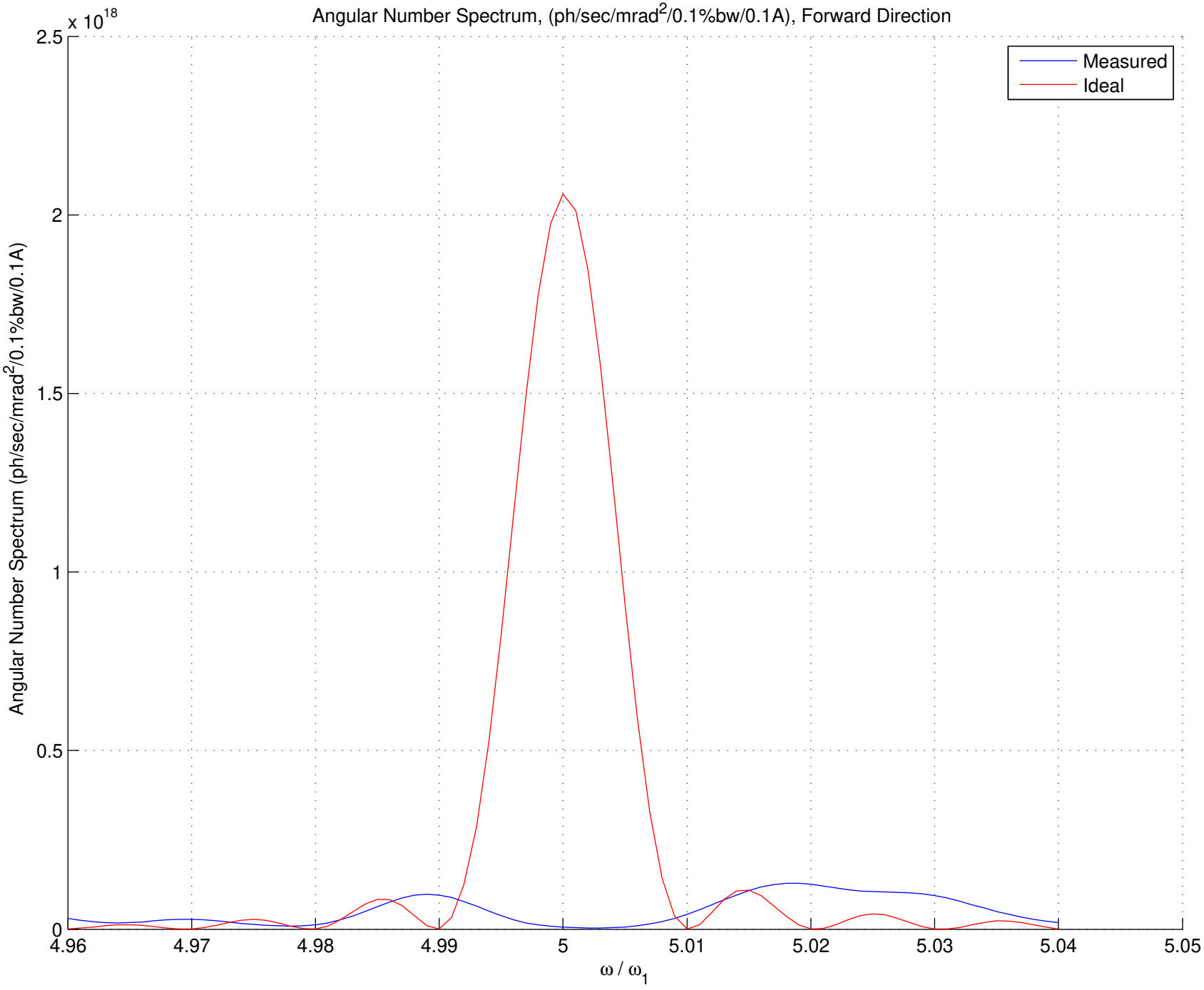

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
2e−11
120
60
1.5e−11
150
30
1e−11
5e−12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(ω), Forward Direction, ω = ω1
90
1e−12
120
60
8e−13
6e−13
150
30
4e−13
2e−13
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^18
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
0
5
10
15
ω / ω1


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^18
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
Measured
Ideal
0
1
2
3
4
5
6
7
8
0.95
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
1.05


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^18
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
0
1
2
3
4
5
6
7
8
2.96
2.97
2.98
2.99
3
3.01
3.02
3.03
3.04
3.05


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^18
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
Measured
Ideal
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
ω / ω1