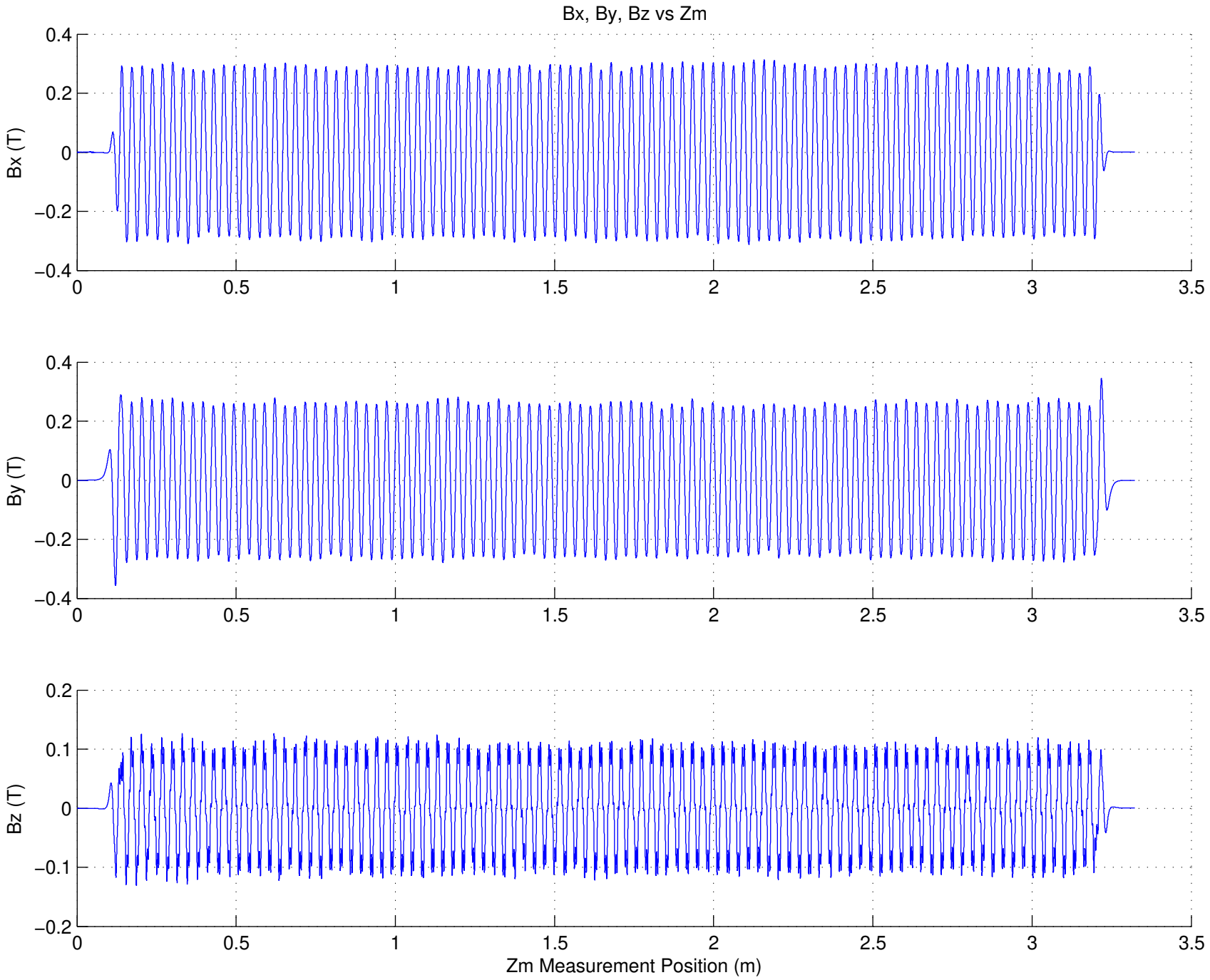
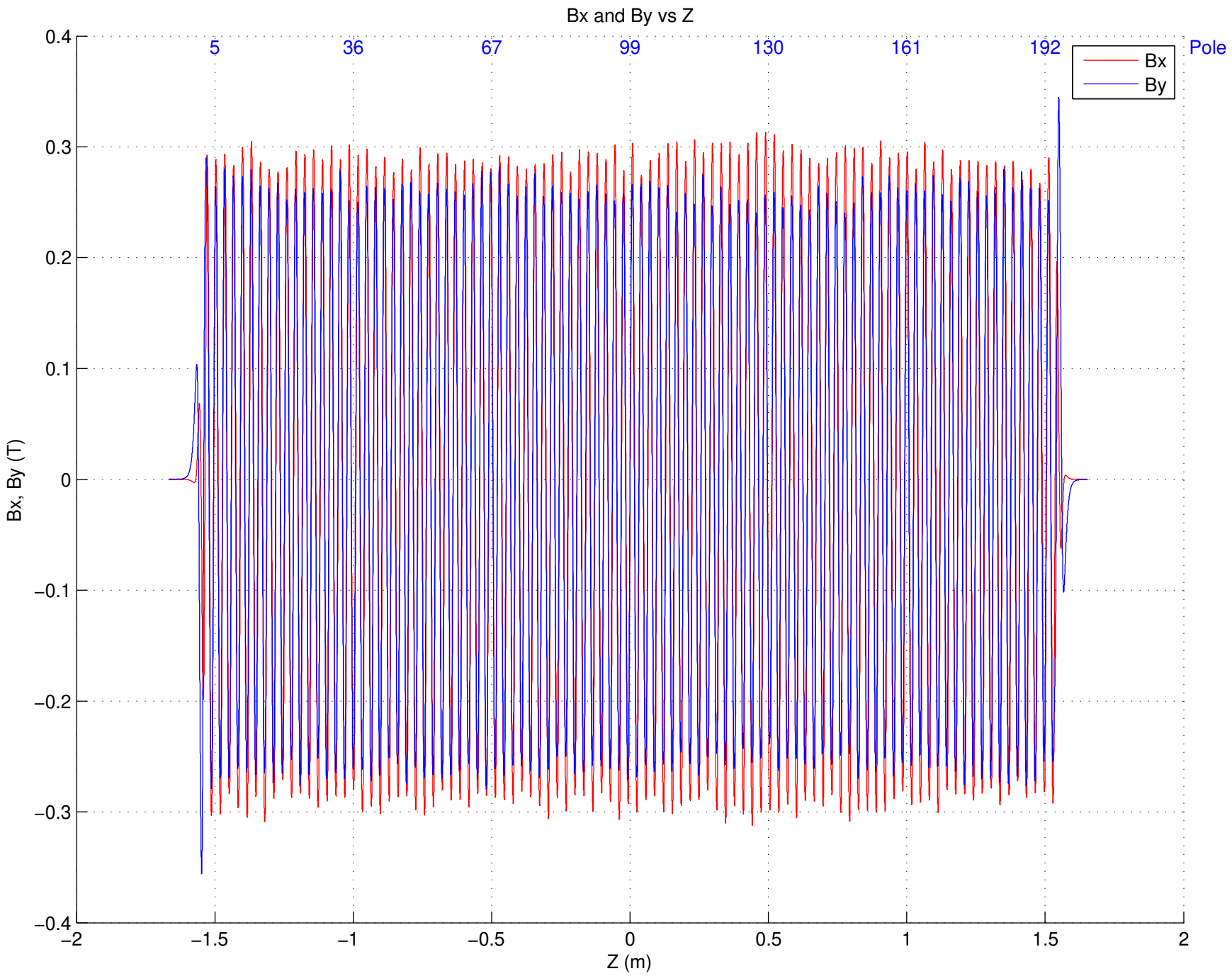
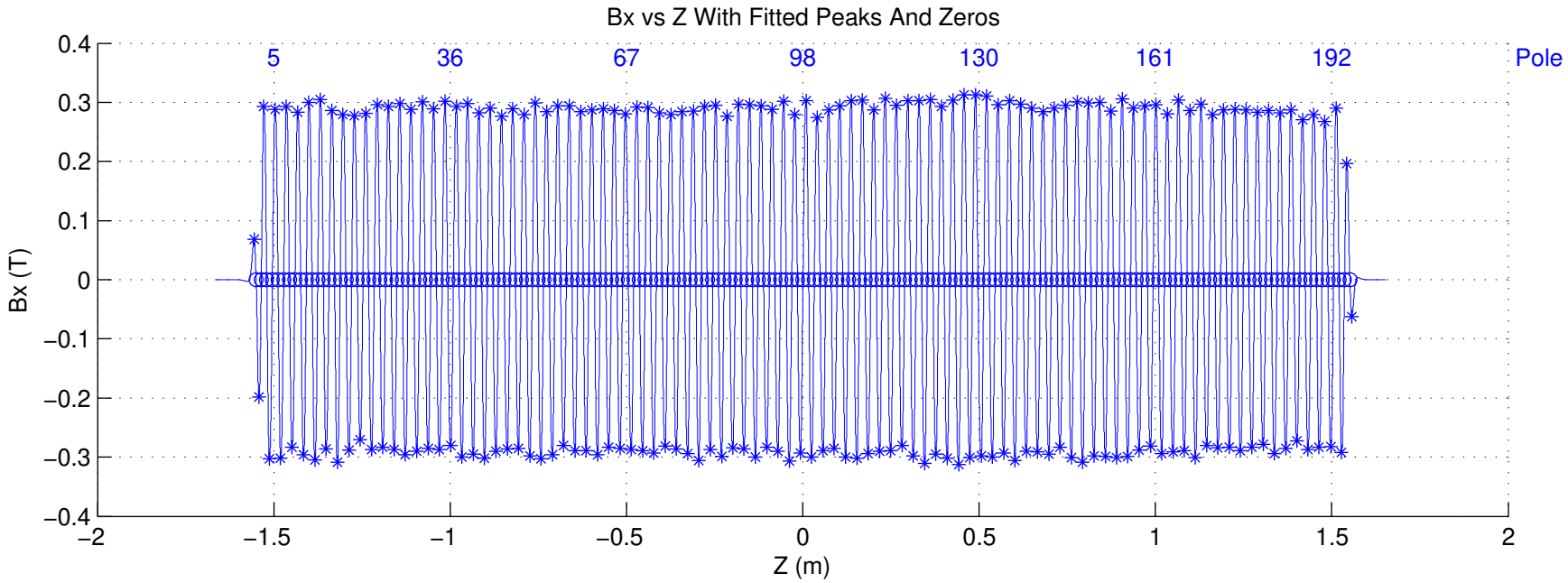
SLAC Magnetic Measurements

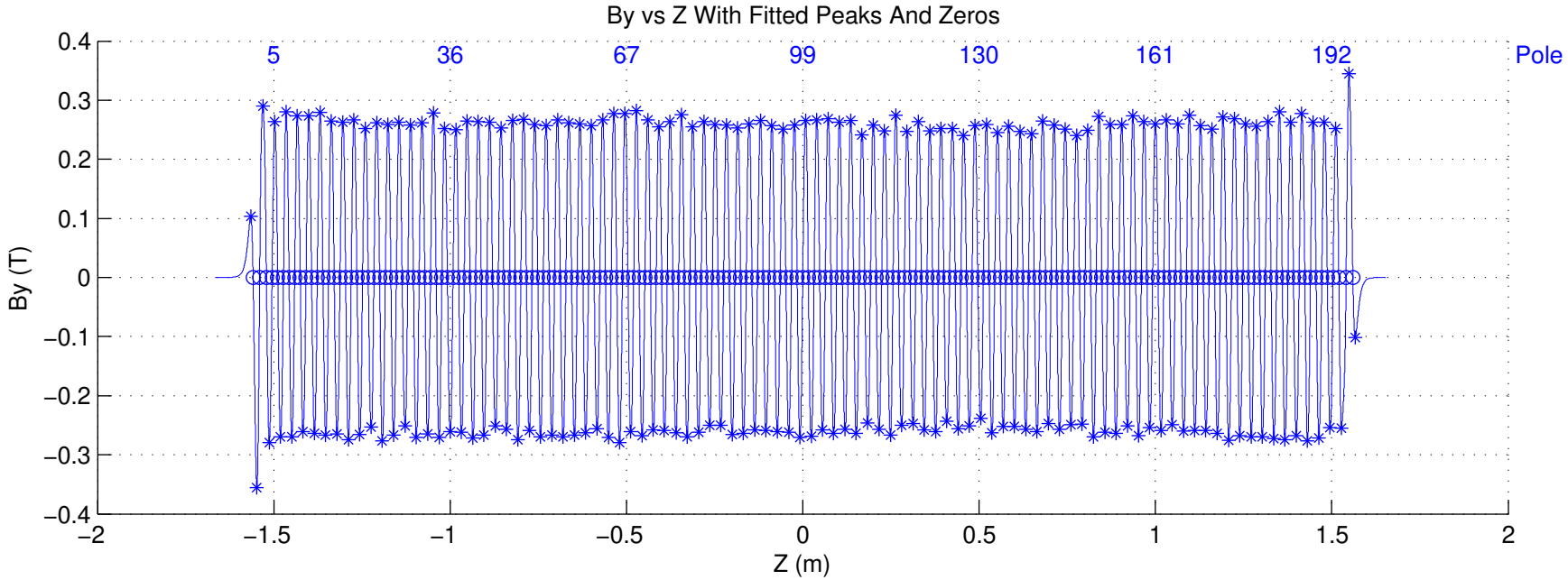
EPU Analysis
−−−−−−−−−−−

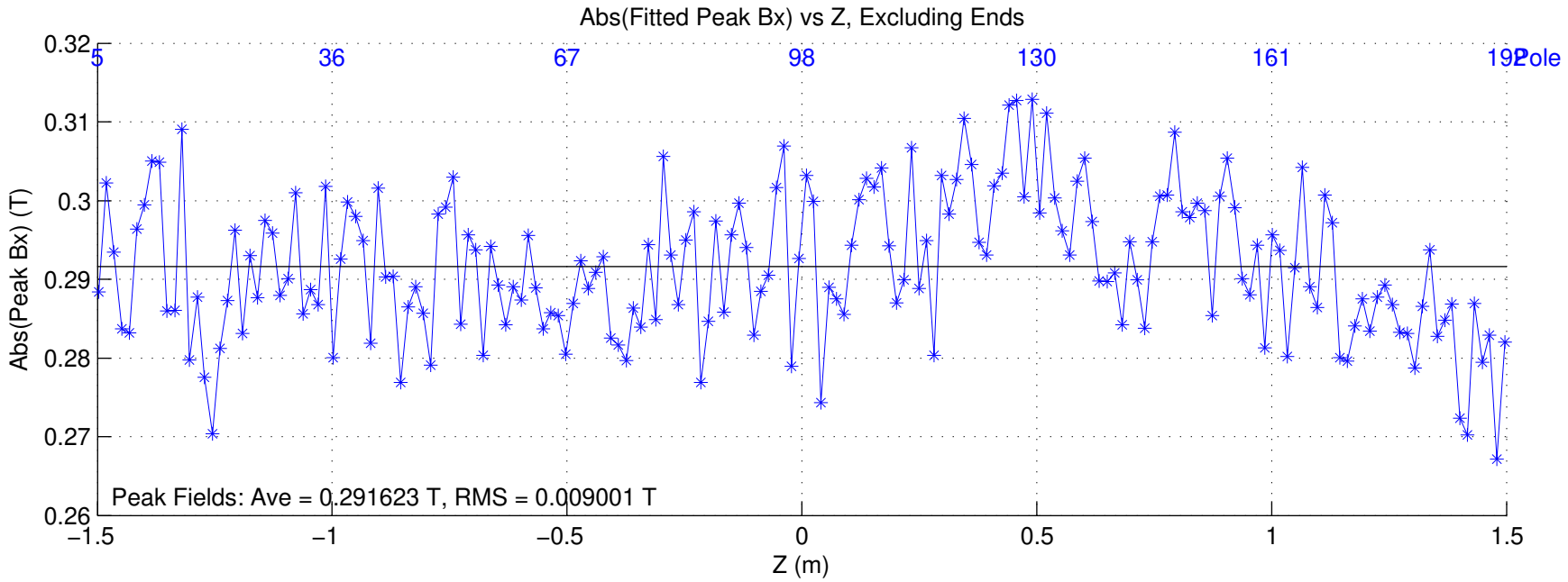
Parameters:
INPUT−FILE−DIR =V:\MET\MagServe\MagData\DELTA\Delta data\Assembled Measurements\Final Measurements\LP13N\KR03
INPUT−FILE−NAME =hall2−anal−probe1−field.dat
INPUT−FILE−TYPE =ZBXYZH
CORR−REQUIRED =0
GAMMA =26671.59
NOM−LAMBDA−U =0
NOM−K−VALUE =0
NOM−LAMBDA−R =0
NUM−POLES =196
NUM−END−POLES =4
CELL−LENGTH =3.656

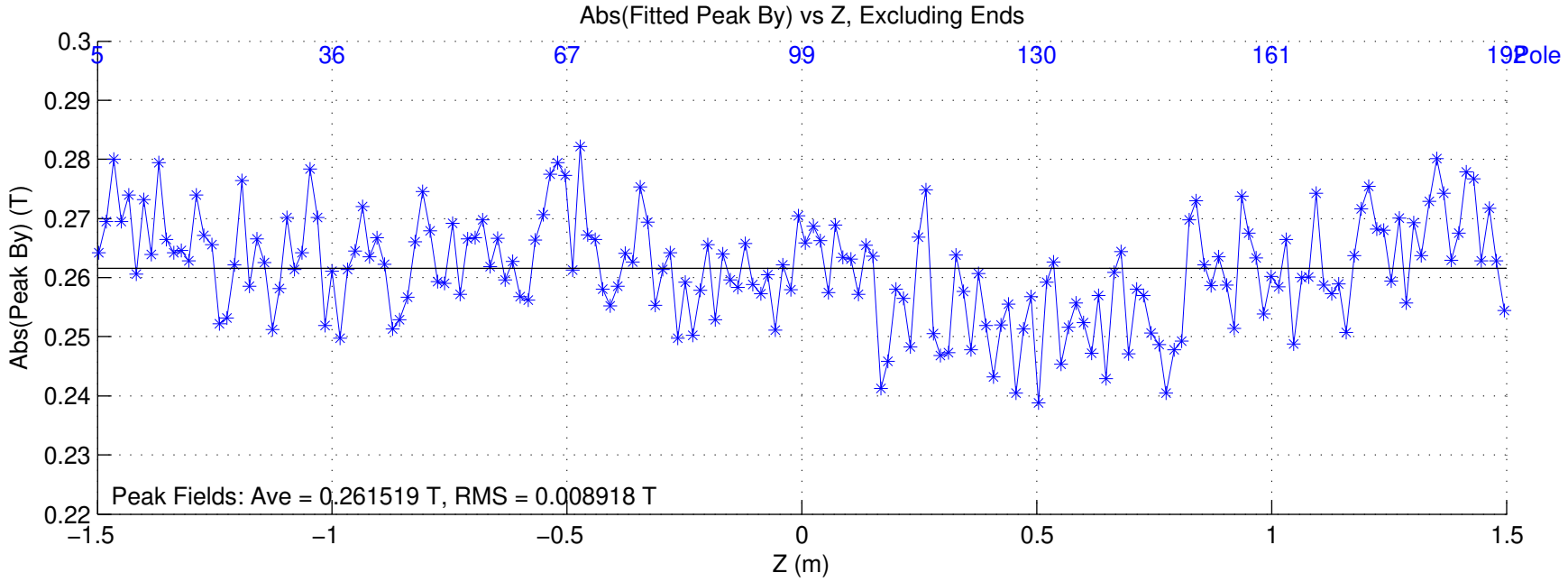

Bx, By, Bz vs Zm
Bx (T)
By (T)
Bz (T)
0.4
0.2
0
−0.2
−0.4
0.1
−0.1
0
0.5
1
1.5
2
2.5
3
3.5
Zm Measurement Position (m)

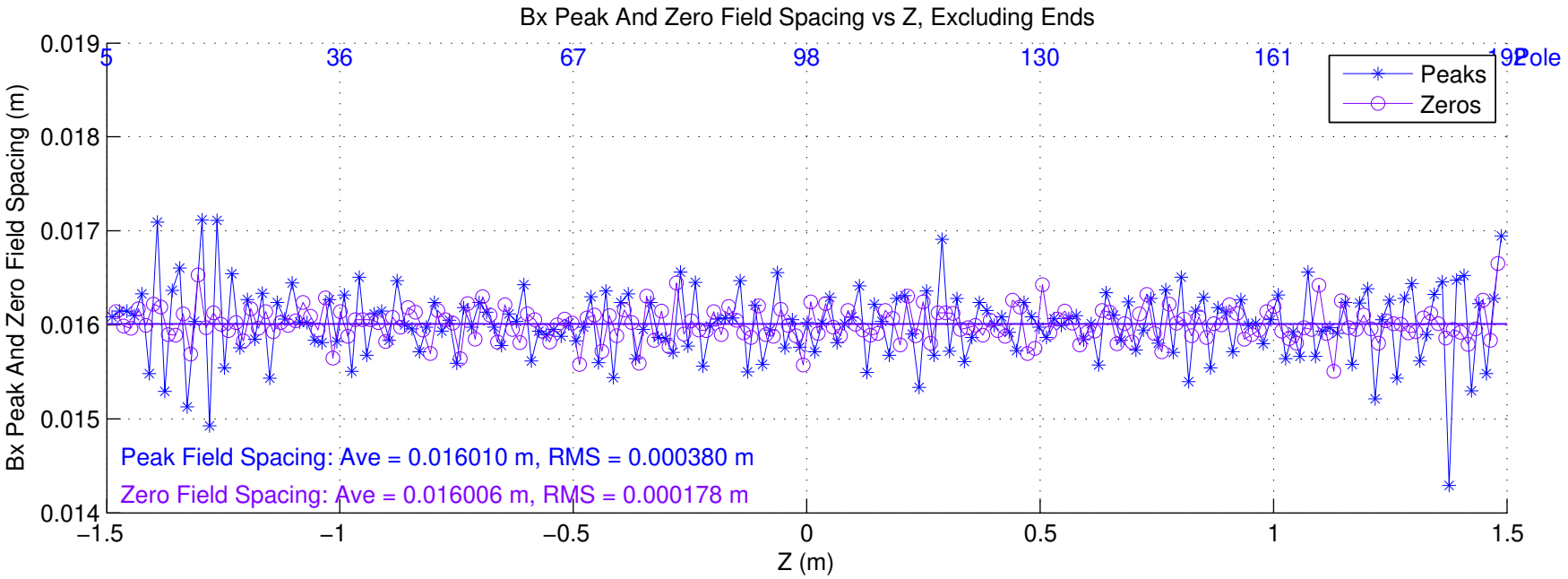

Bx and By vs Z
5
36
67
99
130
161
192
Pole
Bx
By
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
Bx, By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

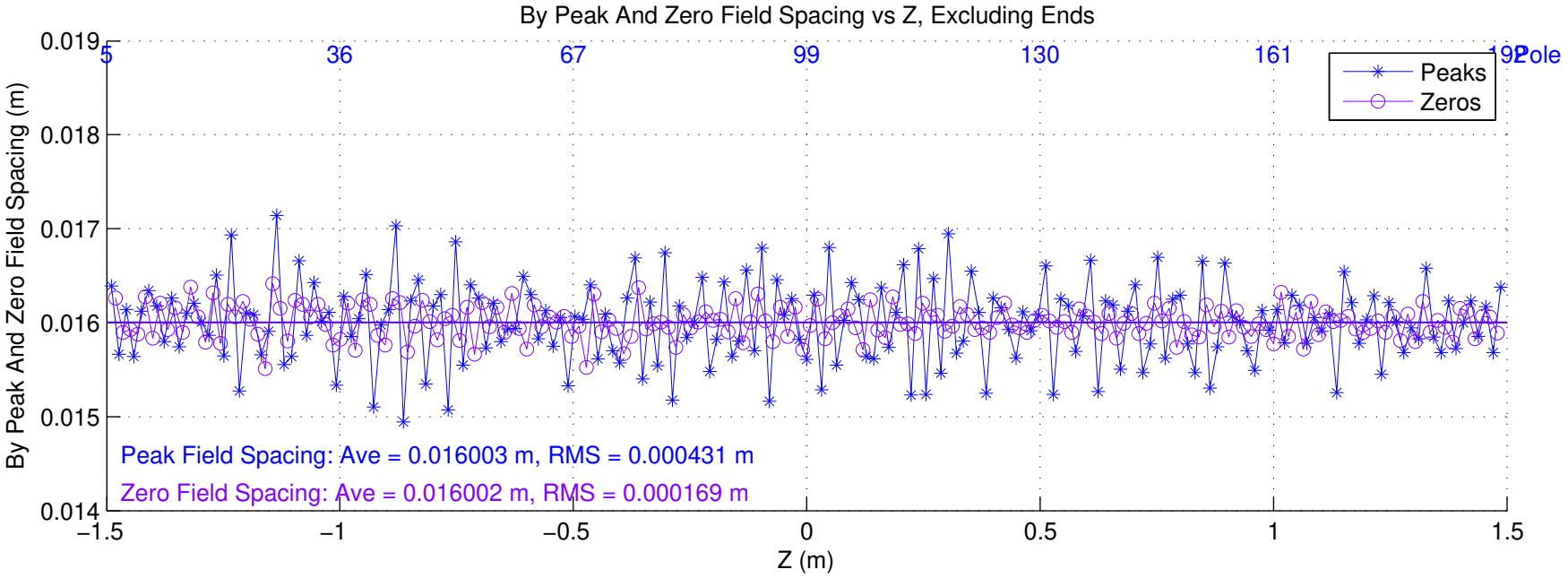

Bx vs Z With Fitted Peaks And Zeros
5
36
67
98
130
161
192
Pole
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
Bx (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

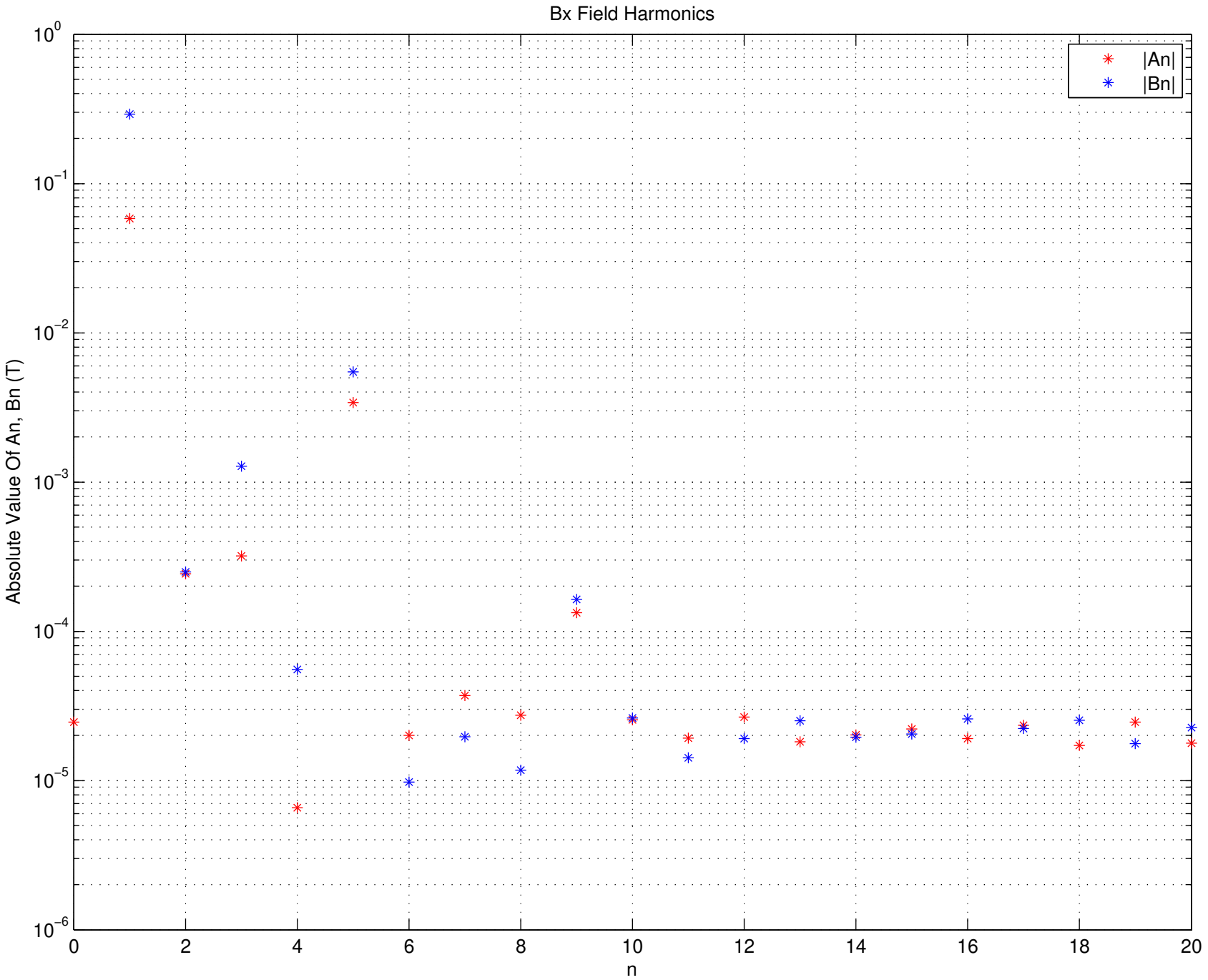

By vs Z With Fitted Peaks And Zeros
5
36
67
99
130
161
192
Pole
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

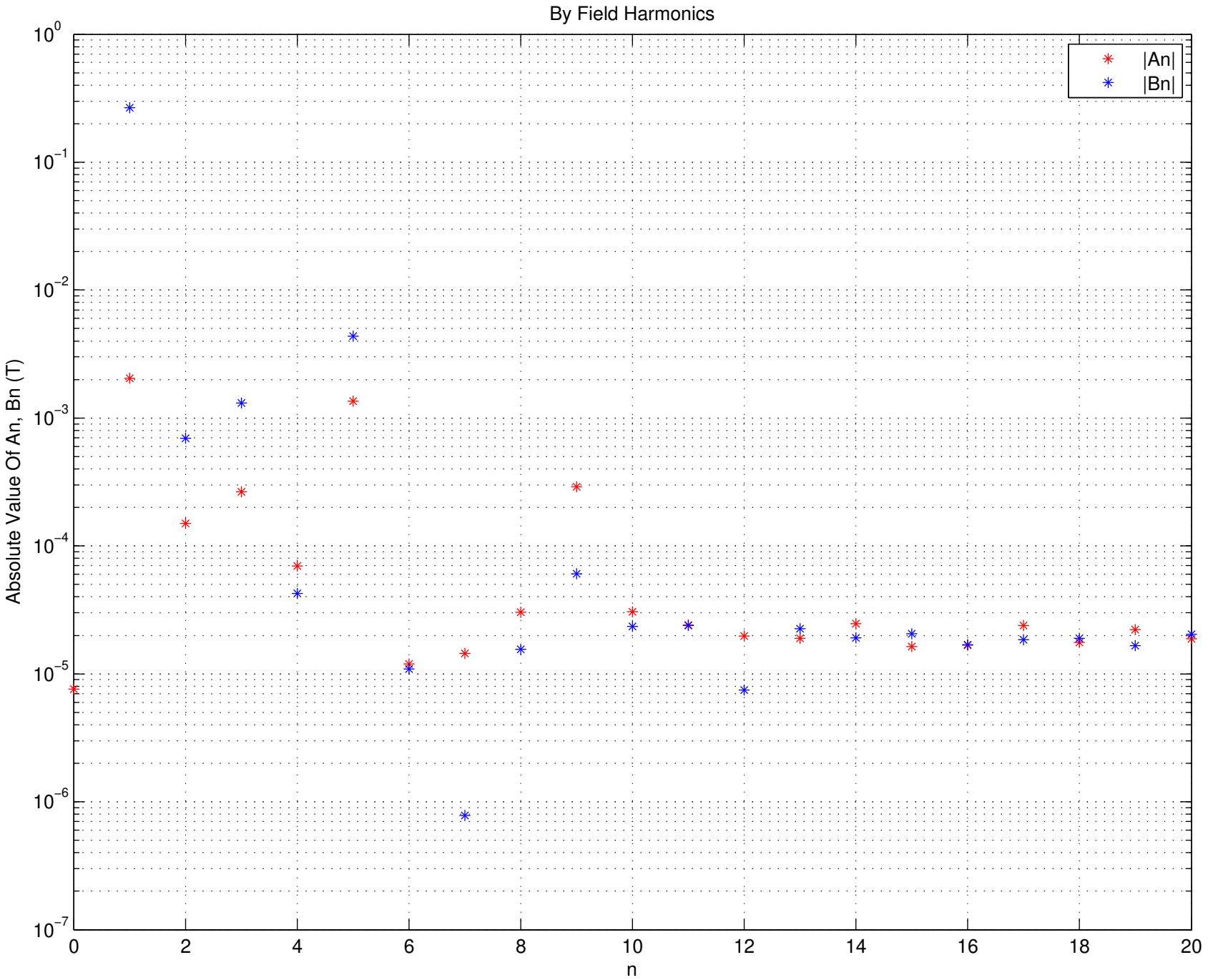

Abs(Fitted Peak Bx) vs Z, Excluding Ends
5
36
67
98
130
161
192
Pole
0.32
0.31
0.3
0.29
0.28
0.27
0.26
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.291623 T, RMS = 0.009001 T
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

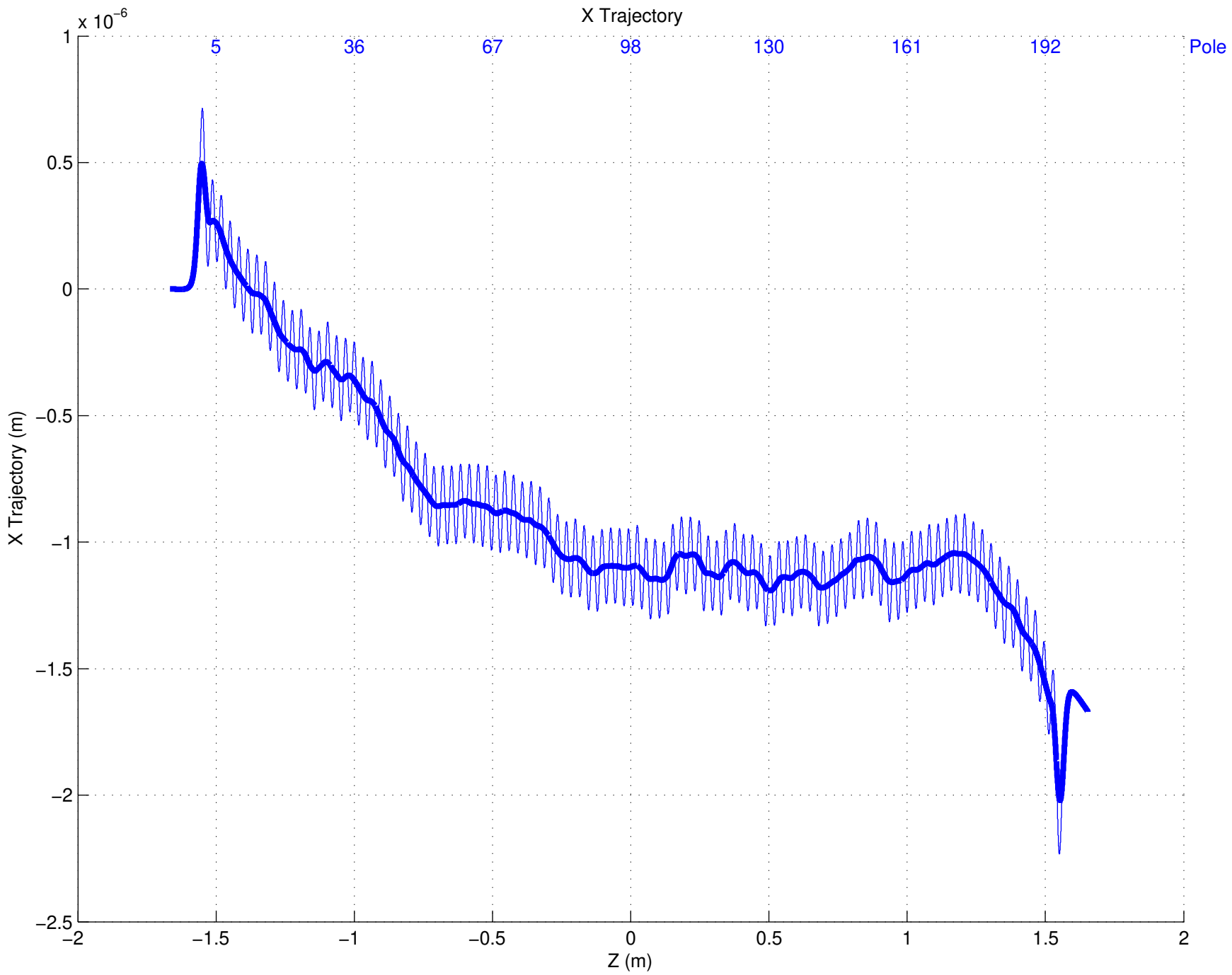

Abs(Fitted Peak By) vs Z, Excluding Ends
5
36
67
99
130
161
192
Pole
0.3
0.29
0.28
0.27
0.26
0.25
0.24
0.23
0.22
Abs(Peak By) (T)
Peak Fields: Ave = 0.261519 T, RMS = 0.008918 T
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

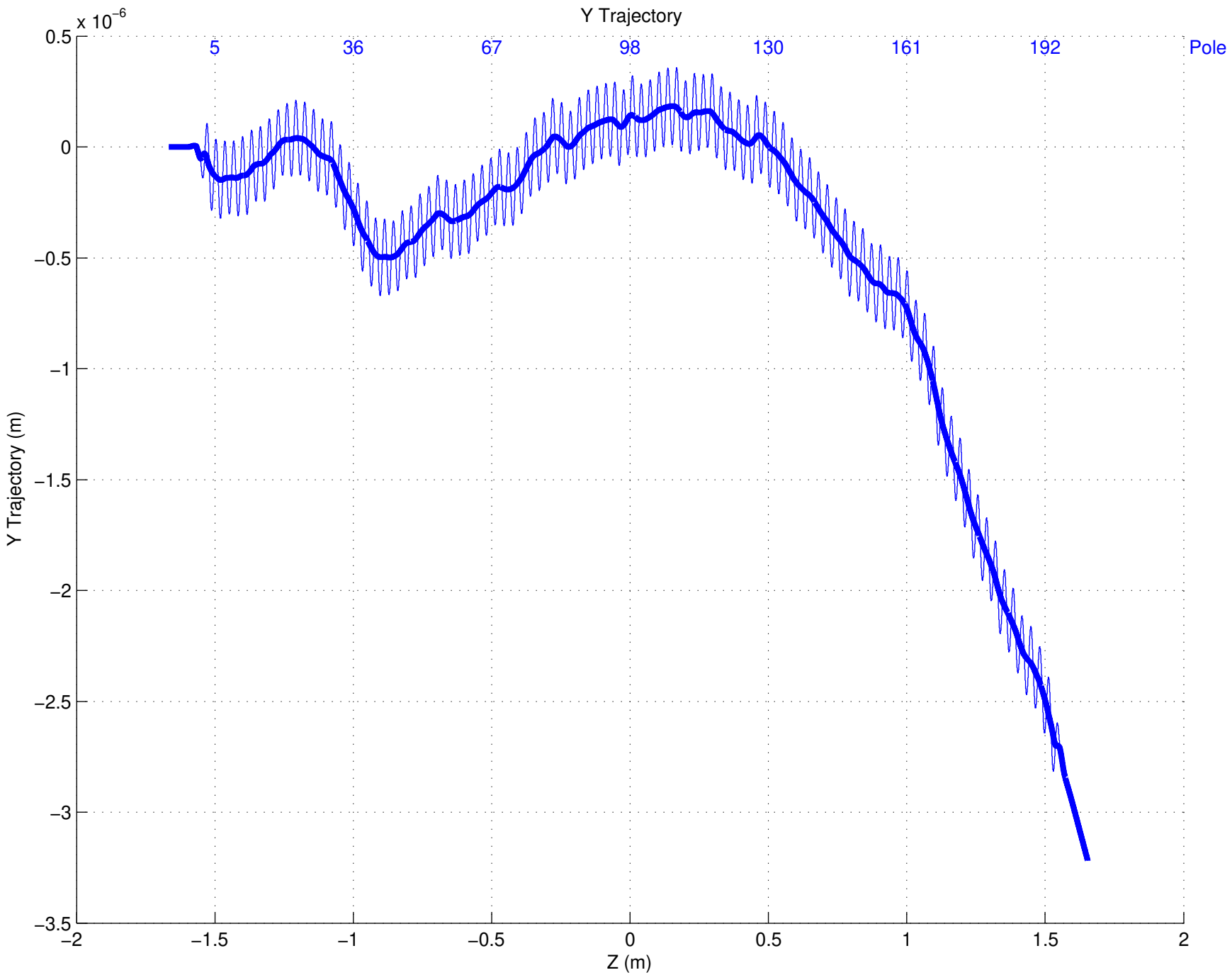

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
5
36
67
98
130
161
192
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016010 m, RMS = 0.000380 m
Zero Field Spacing: Ave = 0.016006 m, RMS = 0.000178 m
0.019
0.018
0.017
0.016
0.015
0.014
−1.5
−1
−0.5
0
0.5
1
1.5

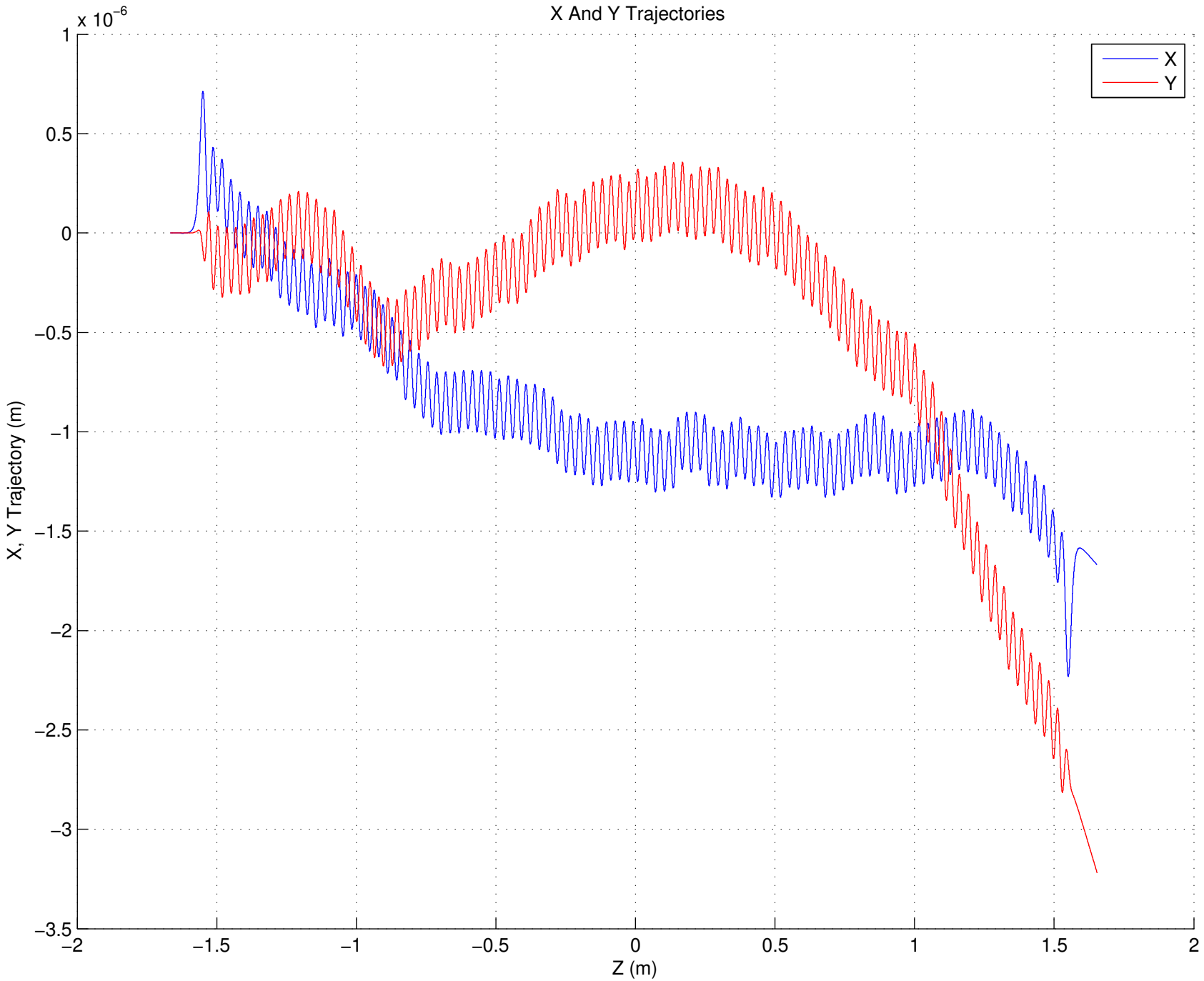

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
5
36
67
99
130
161
192
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016003 m, RMS = 0.000431 m
Zero Field Spacing: Ave = 0.016002 m, RMS = 0.000169 m
0.019
0.018
0.017
0.016
0.015
0.014
−1.5
−1
−0.5
0
0.5
1
1.5

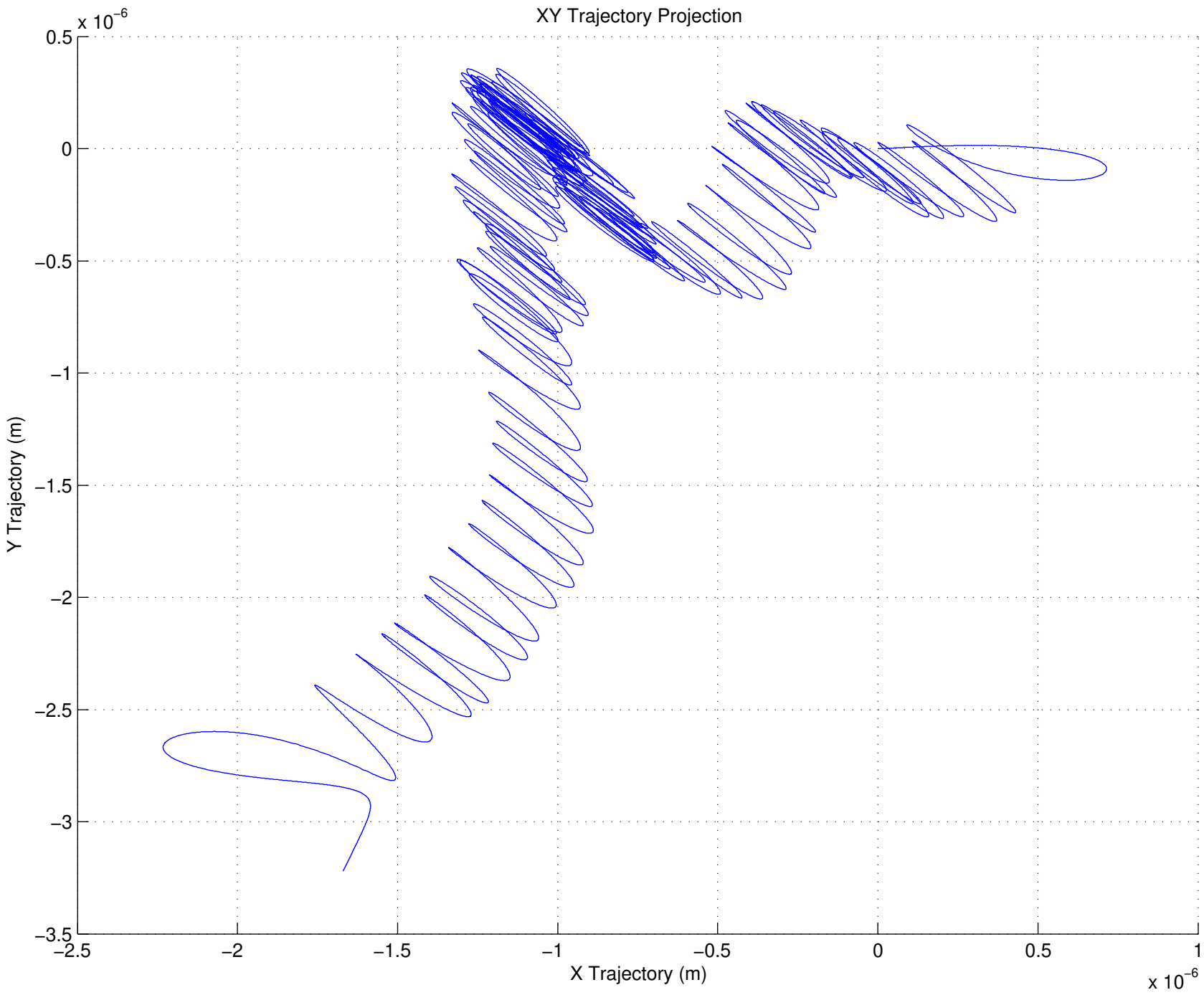

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20

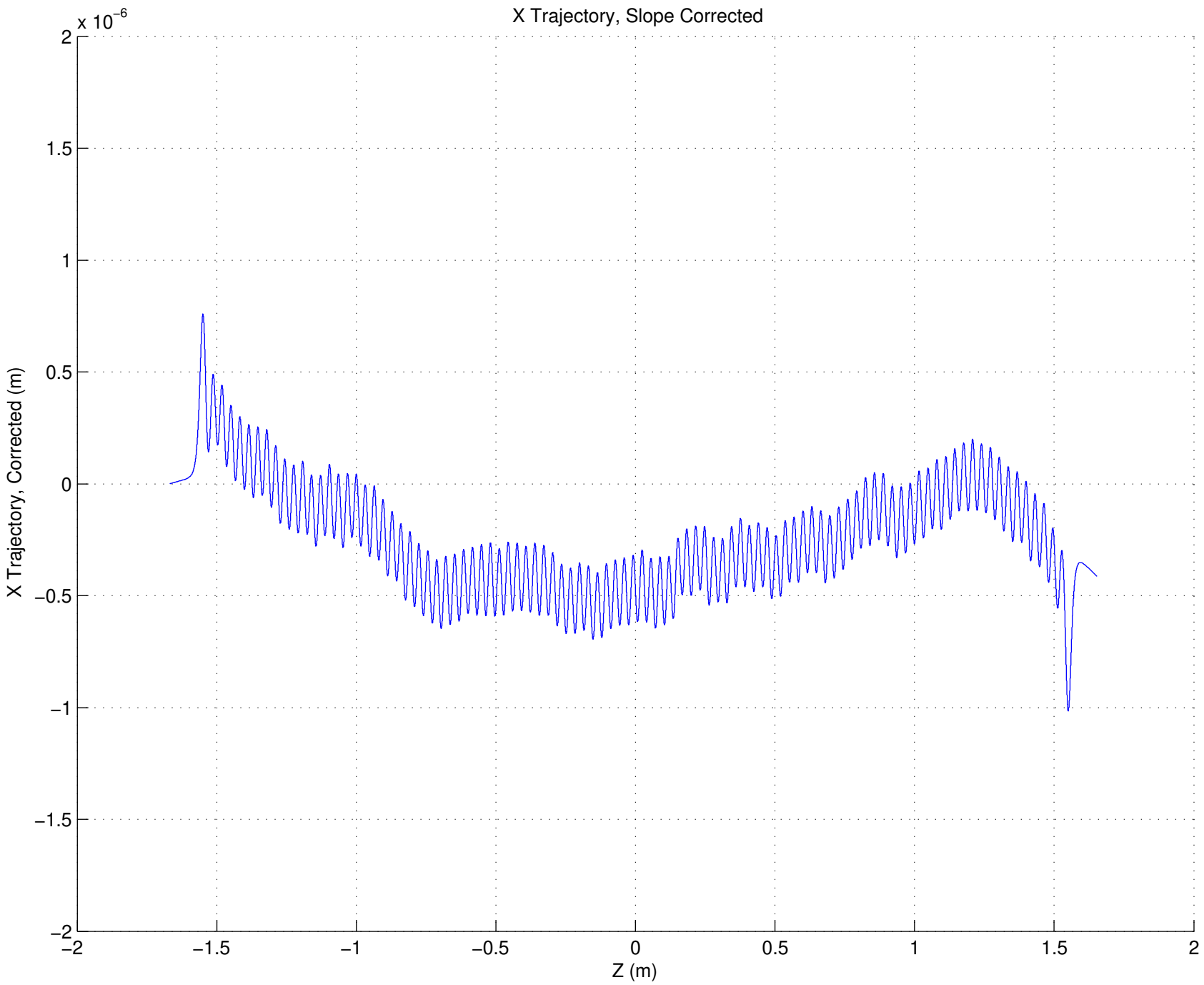

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

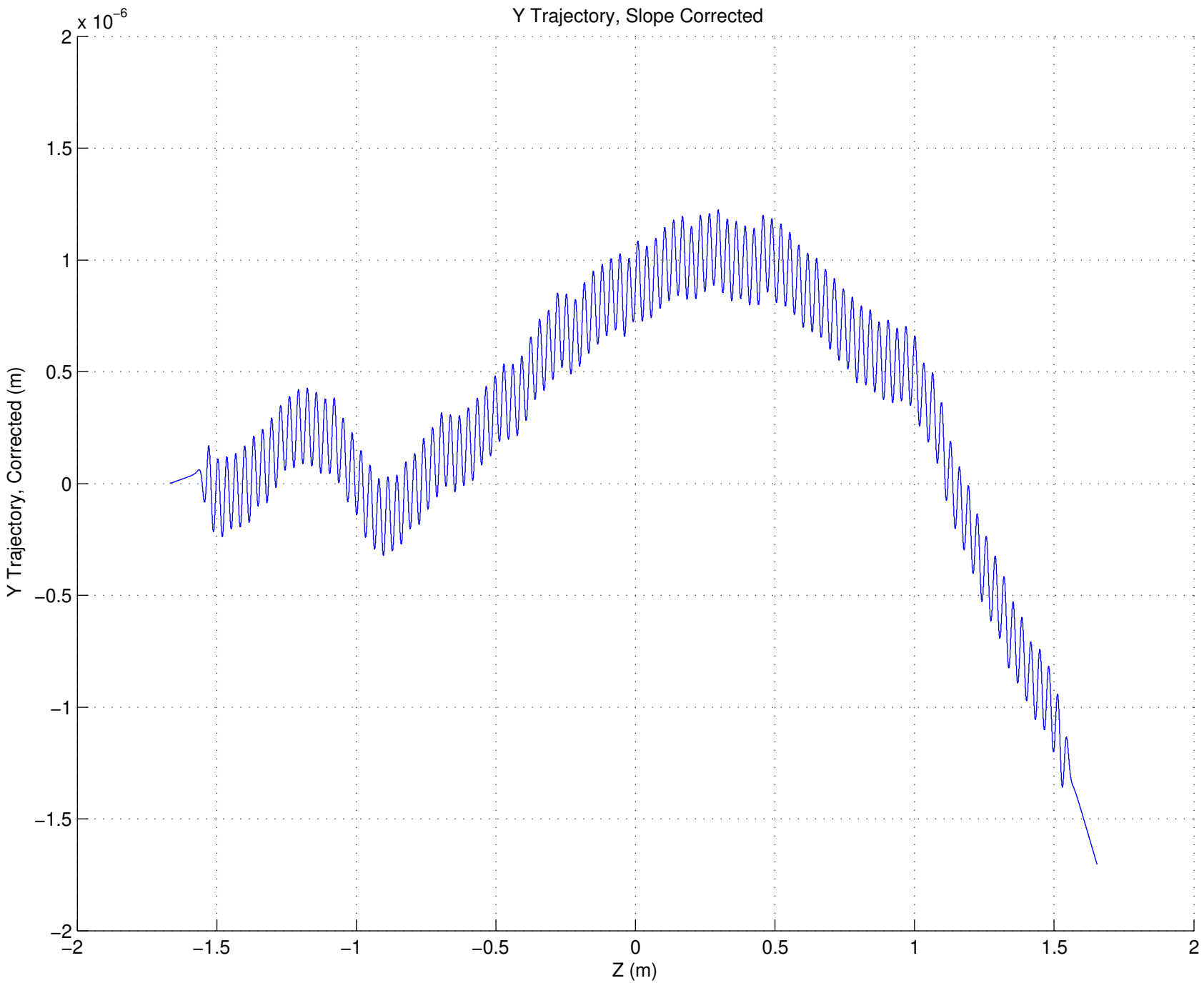

X Trajectory
x 10^-6
5
36
67
98
130
161
192
Pole
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
X Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

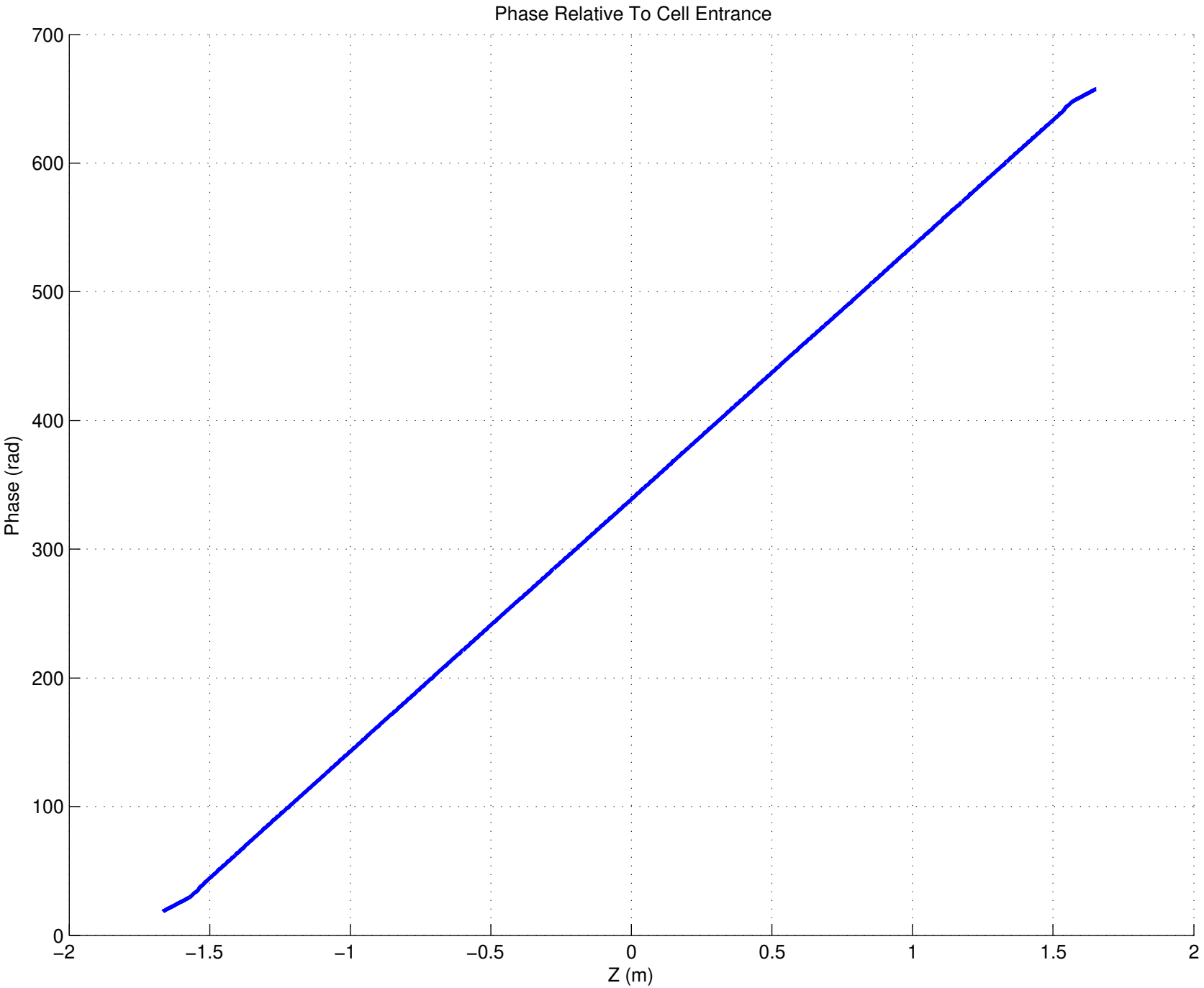

Y Trajectory
x 10^-6
5
36
67
98
130
161
192
Pole
0.5
0
−0.5
−1
−1.5
−2
−2.5
−3
−3.5
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

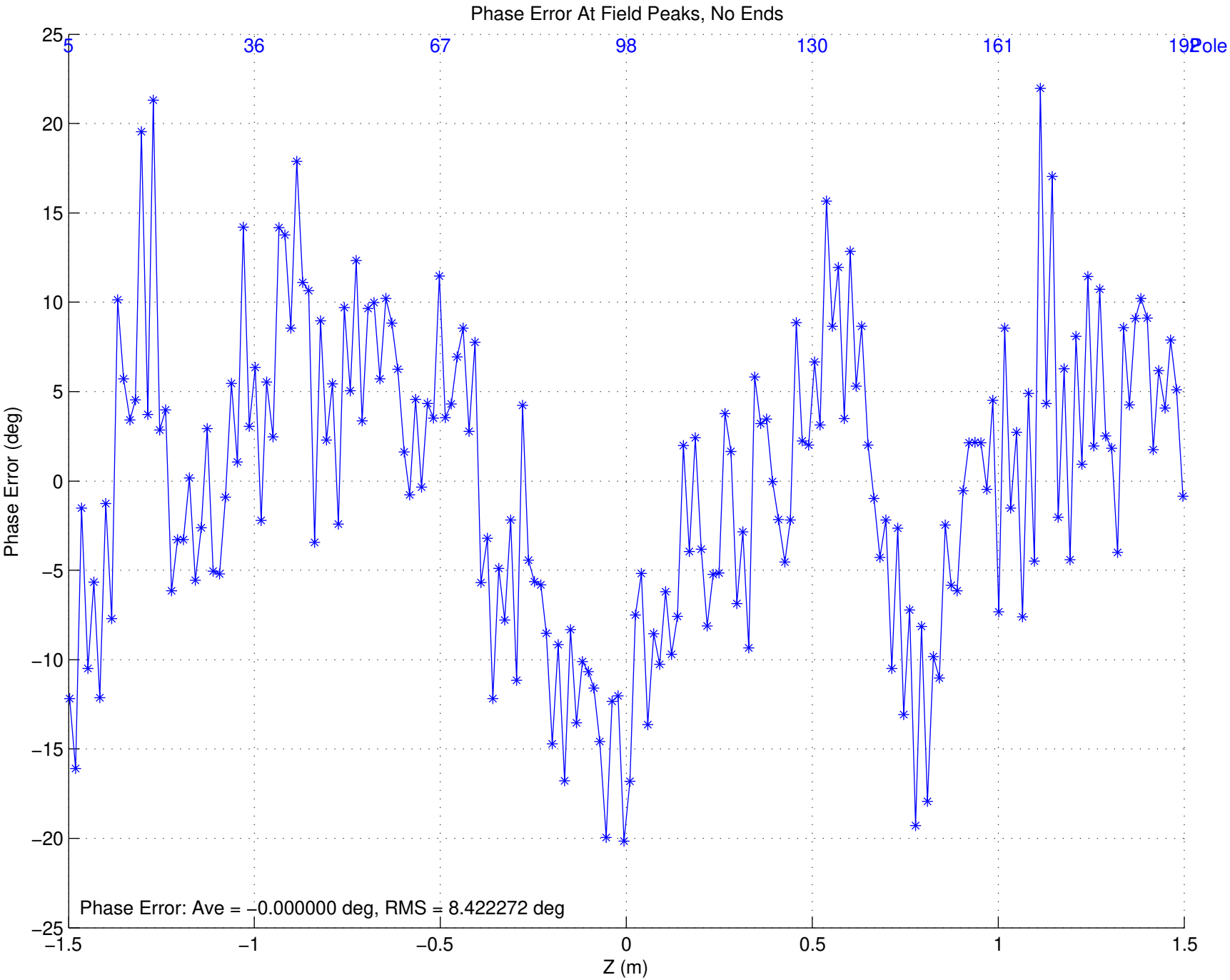

X And Y Trajectories
x 10^-6
X
Y
X, Y Trajectory (m)
Z (m)
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
−3
−3.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

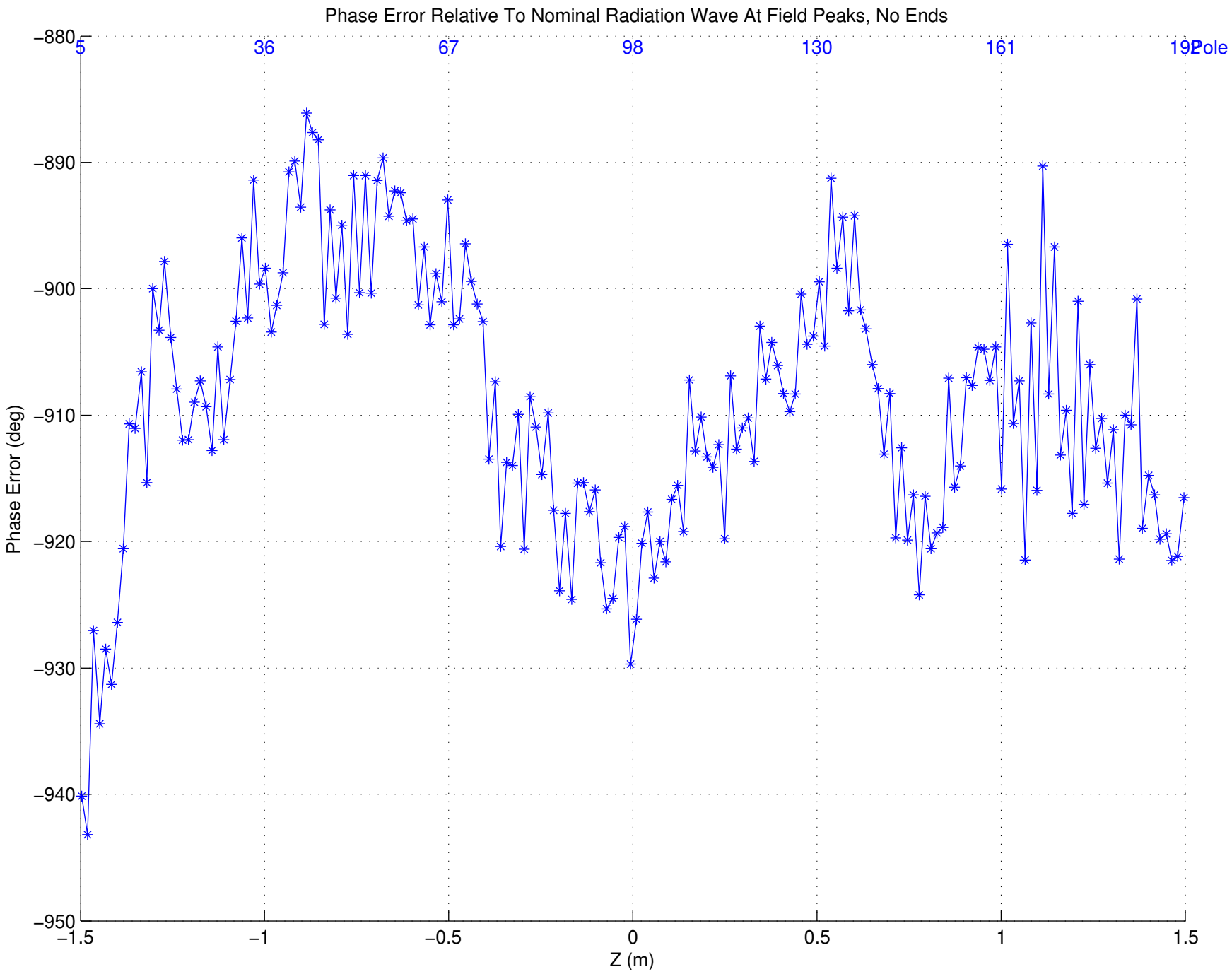

XY Trajectory Projection
x 10^-6
0.5
0
−0.5
−1
−1.5
−2
−2.5
−3
−3.5
Y Trajectory (m)
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
X Trajectory (m)
x 10^-6

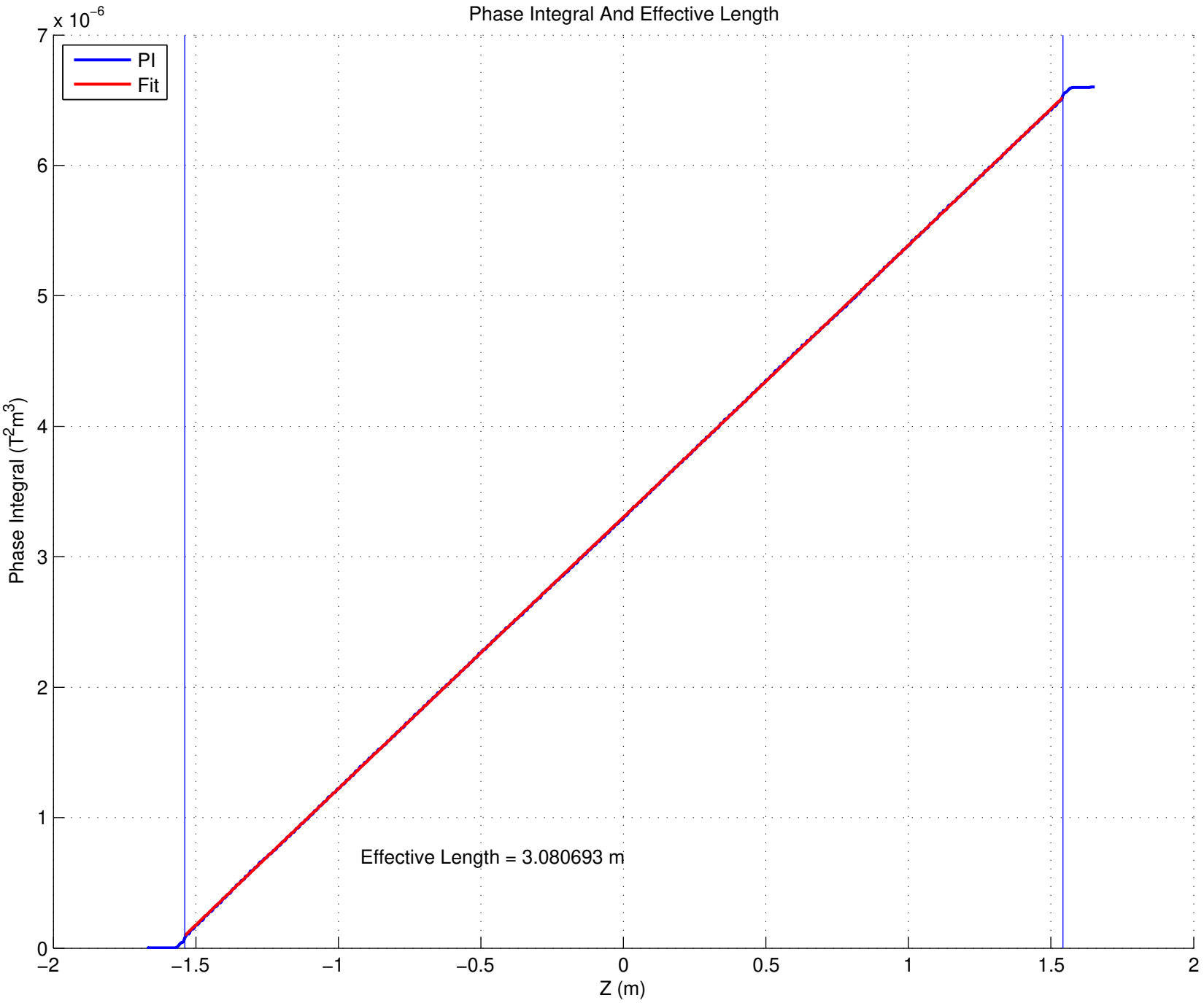

X Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

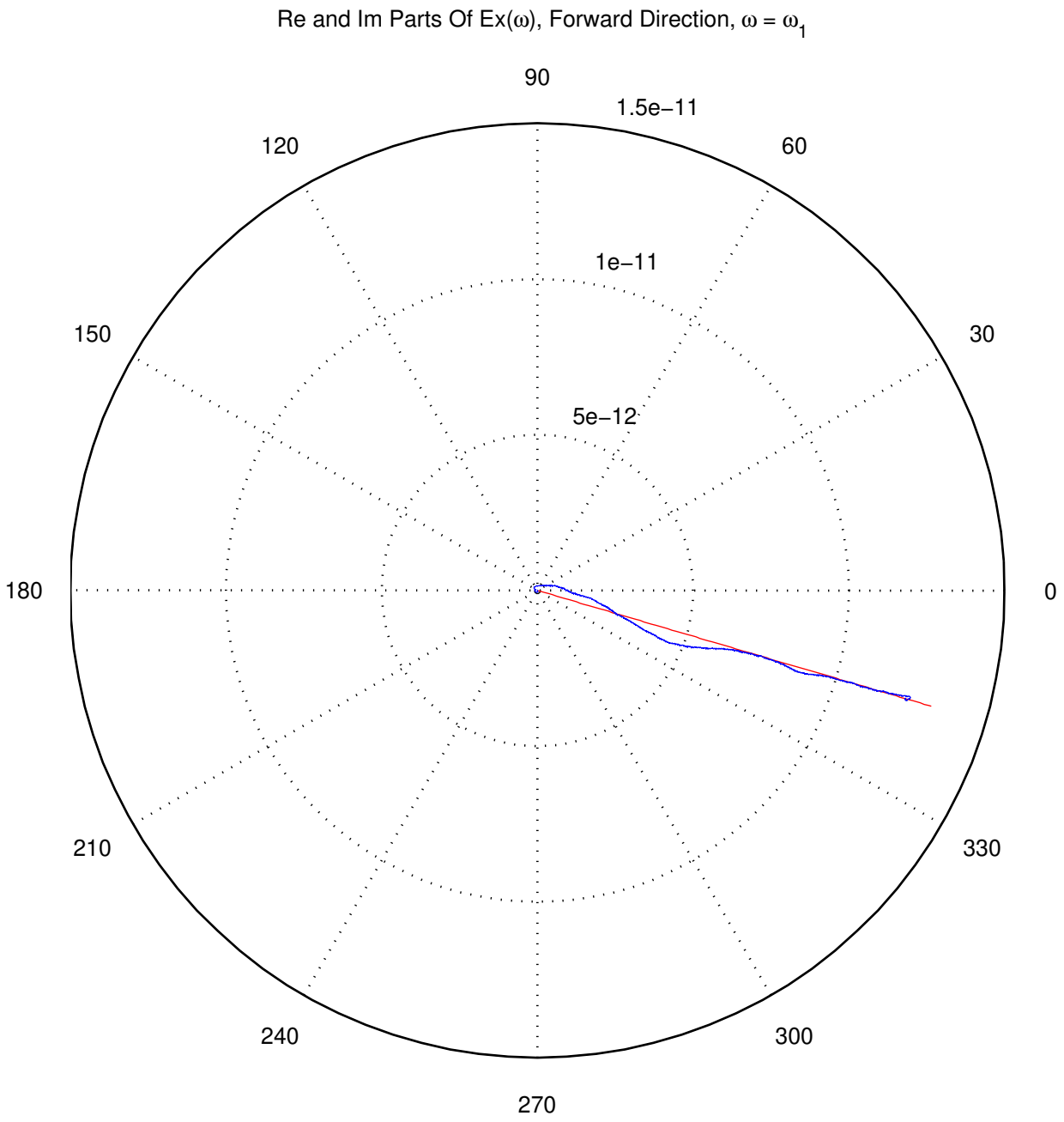

Y Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

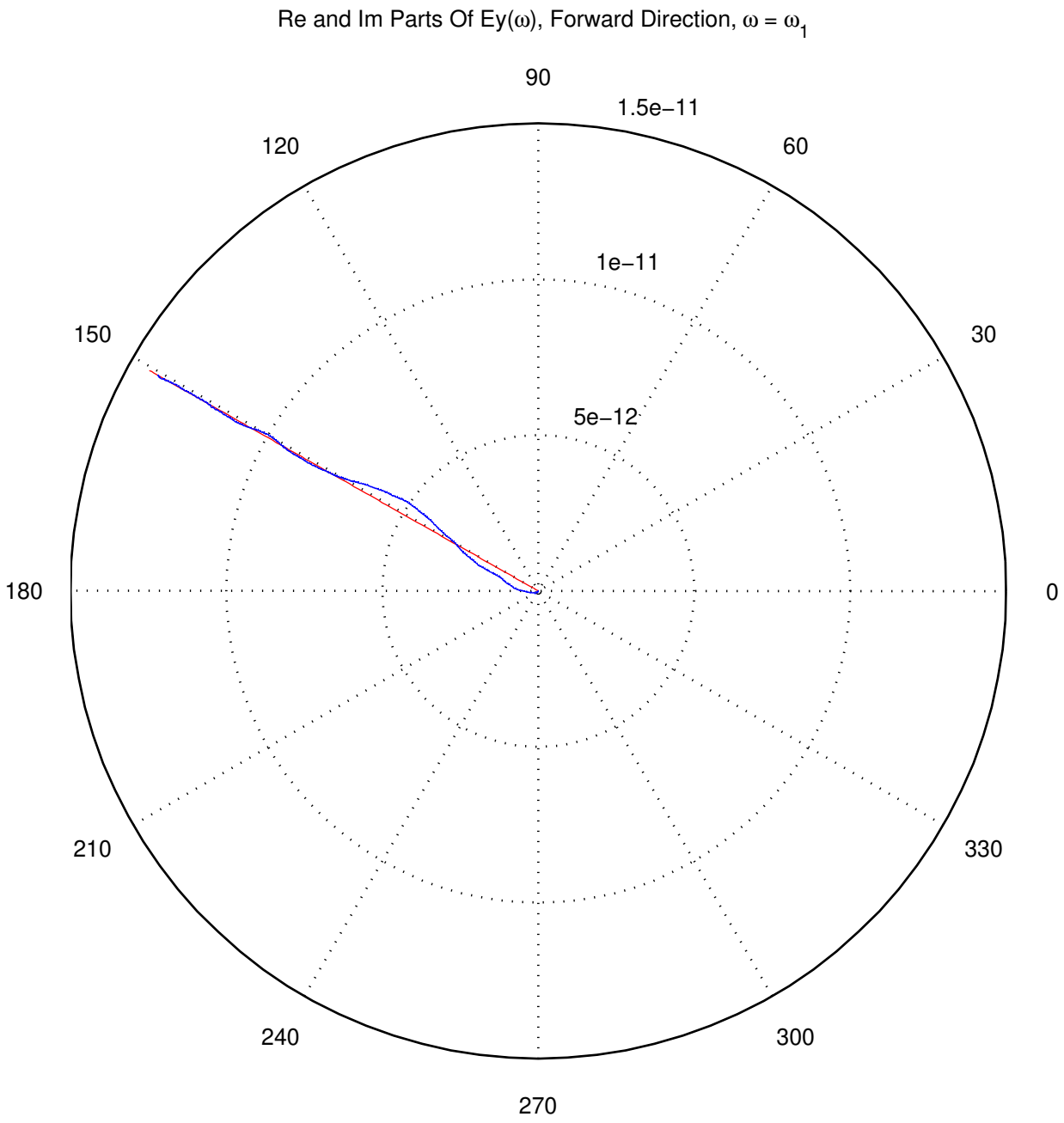

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

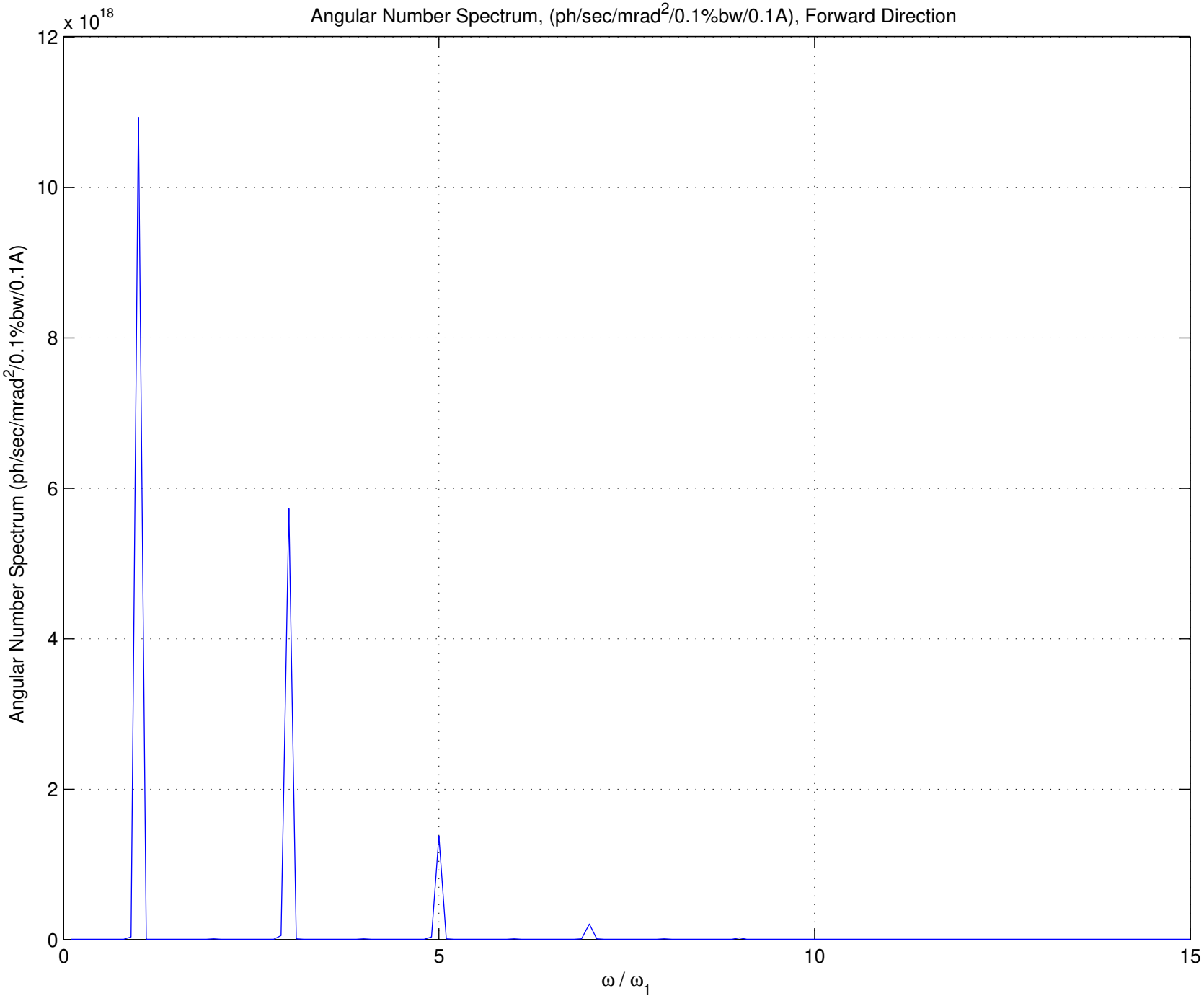

Phase Error At Field Peaks, No Ends
5
36
67
98
130
161
192
Pole
25
20
15
10
5
0
−5
−10
−15
−20
−25
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = −0.000000 deg, RMS = 8.422272 deg

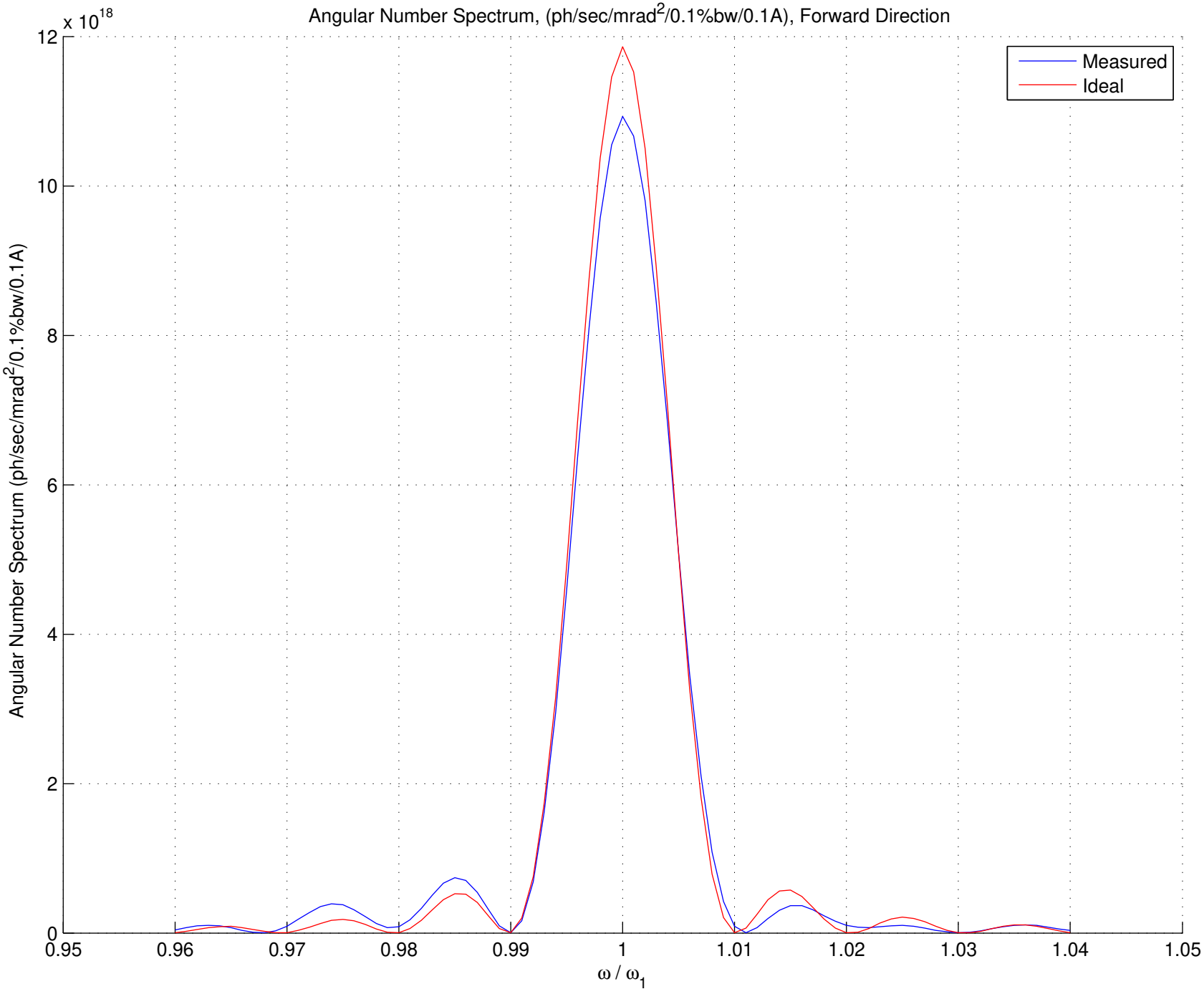

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
5
36
67
98
130
161
192
Pole
−880
−890
−900
−910
−920
−930
−940
−950
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

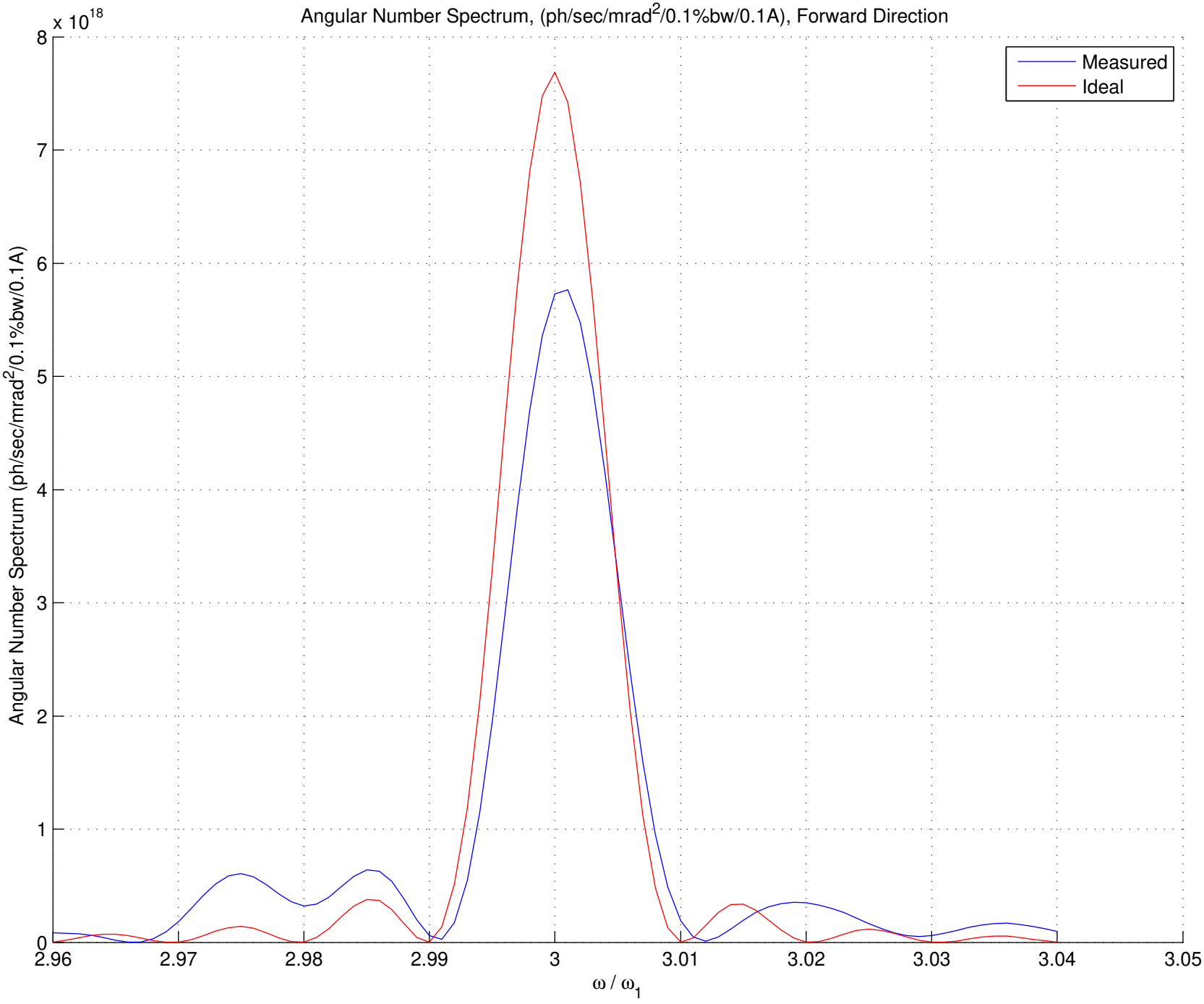

Phase Integral And Effective Length
x 10^-6
PI
Fit
Phase Integral (T^2m^3)
Z (m)
Effective Length = 3.080693 m
7
6
5
4
3
2
1
0
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

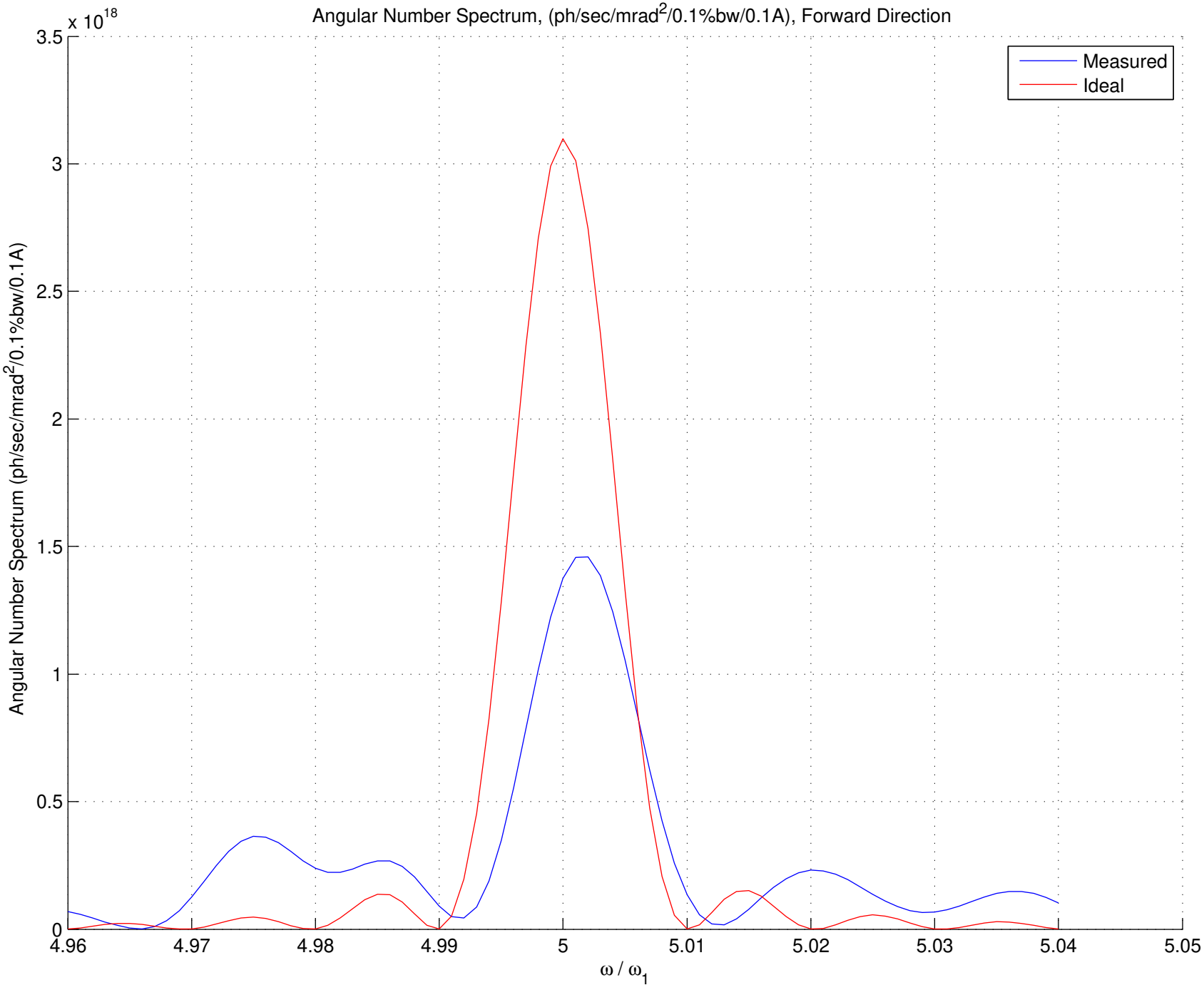

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
1.5e−11
120
60
1e−11
150
30
5e−12
180
0
210
330
240
300
270


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


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^18
12
10
8
6
4
2
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
2
4
6
8
10
12
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
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
Measured
Ideal
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/mrad^2/0.1%bw/0.1A), Forward Direction
x 10^{18}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
3.5
3
2.5
2
1.5
1
0.5
0
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
ω / ω$_1$
Measured
Ideal