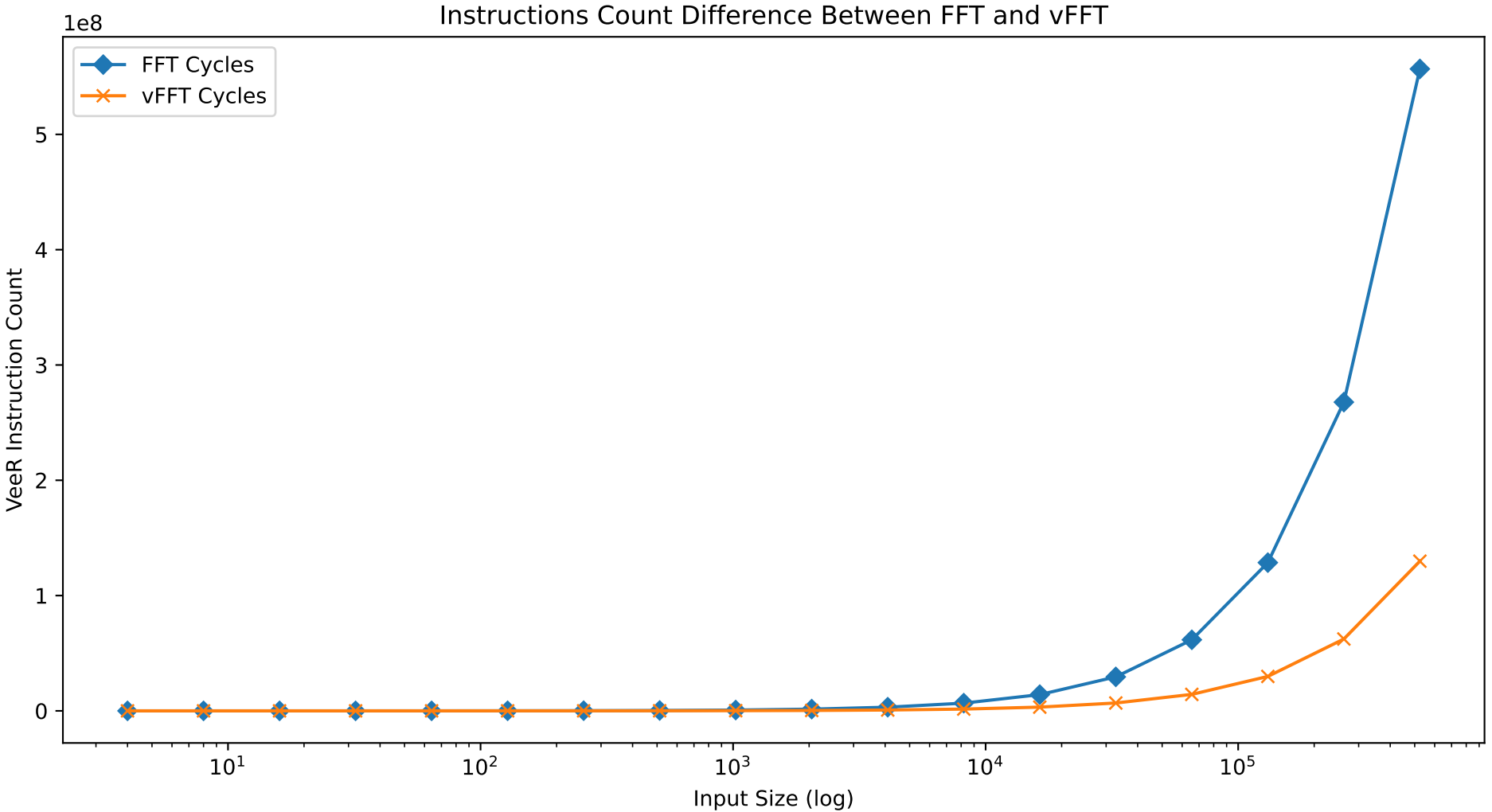
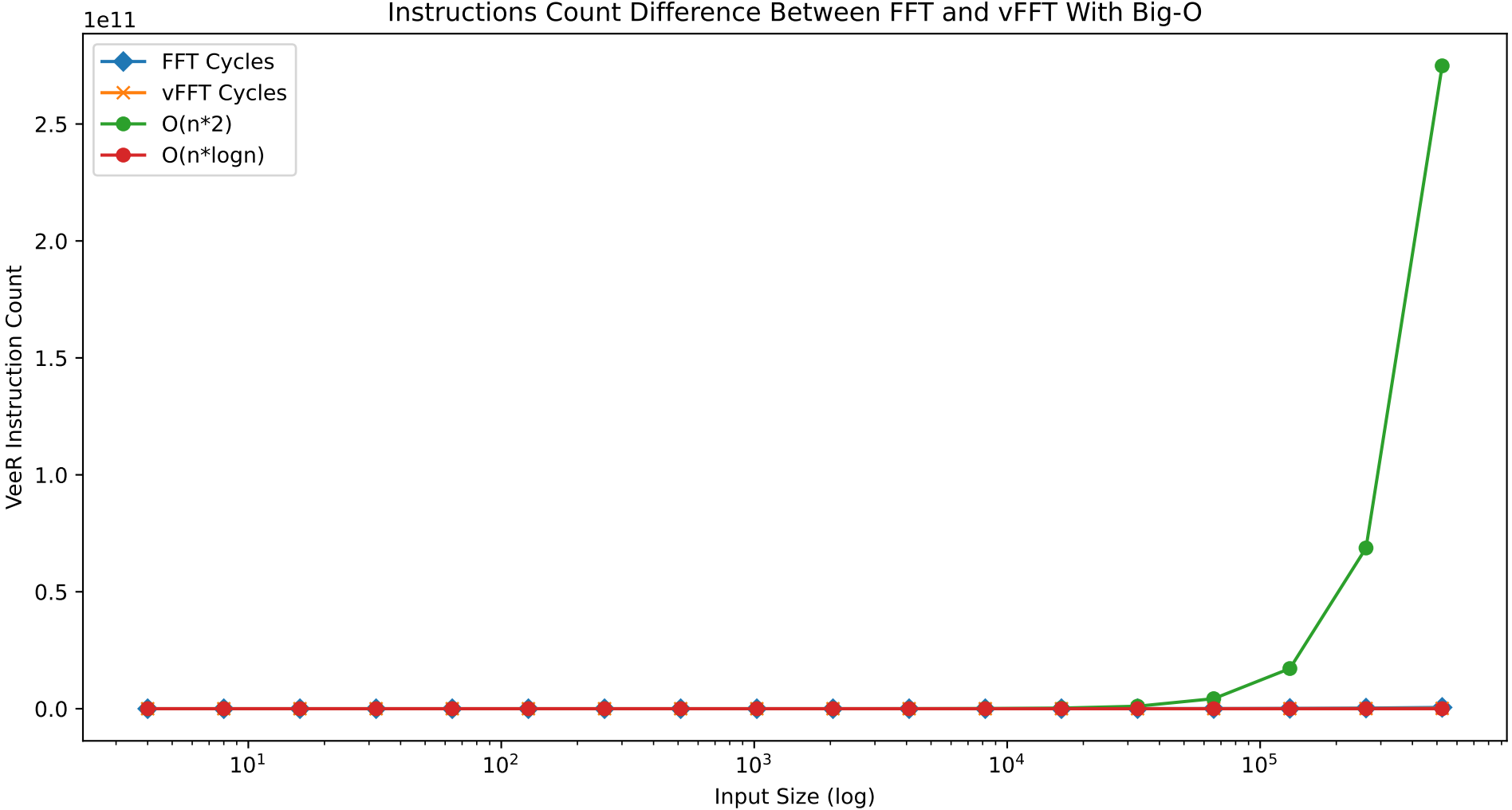
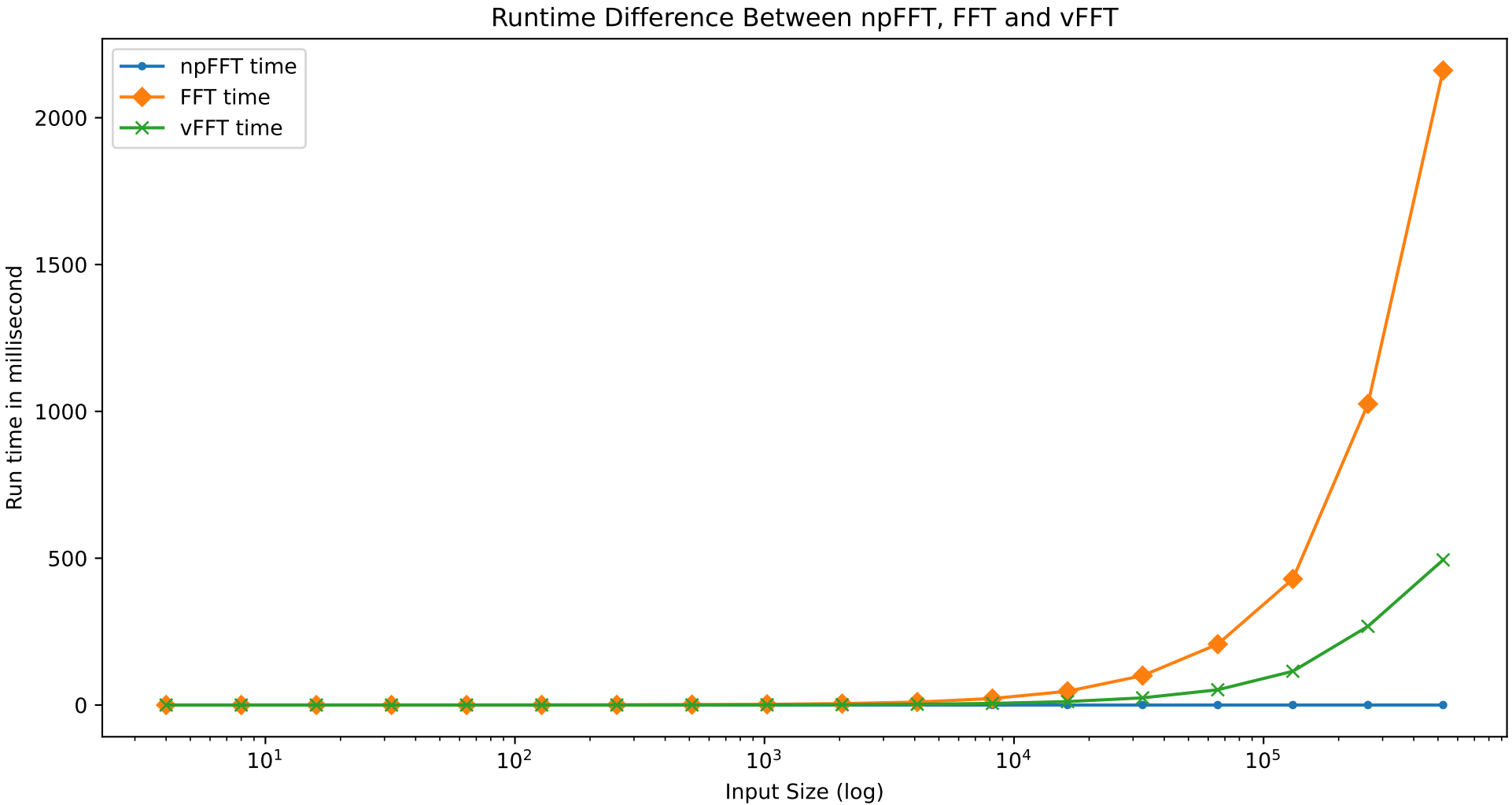
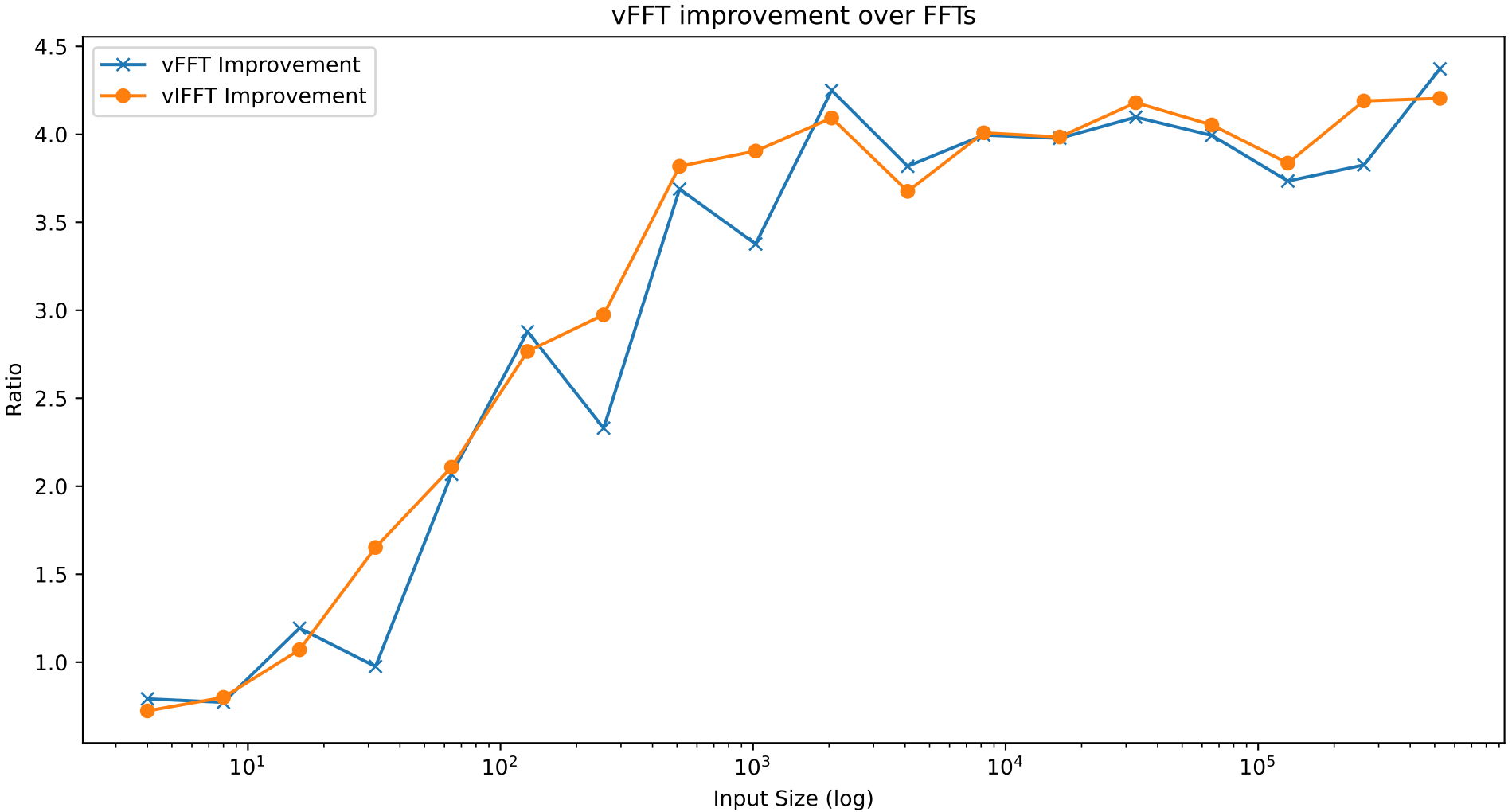
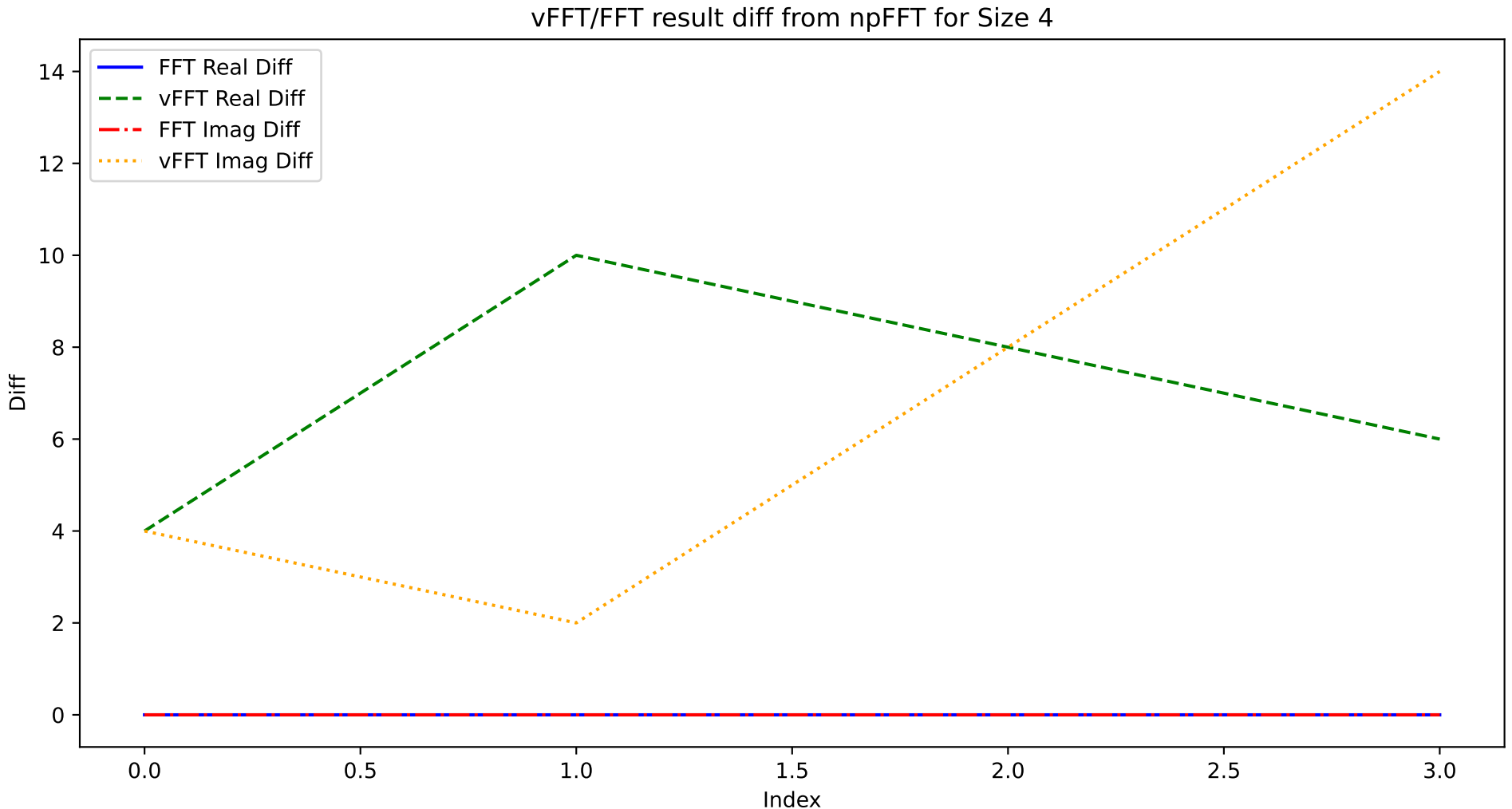
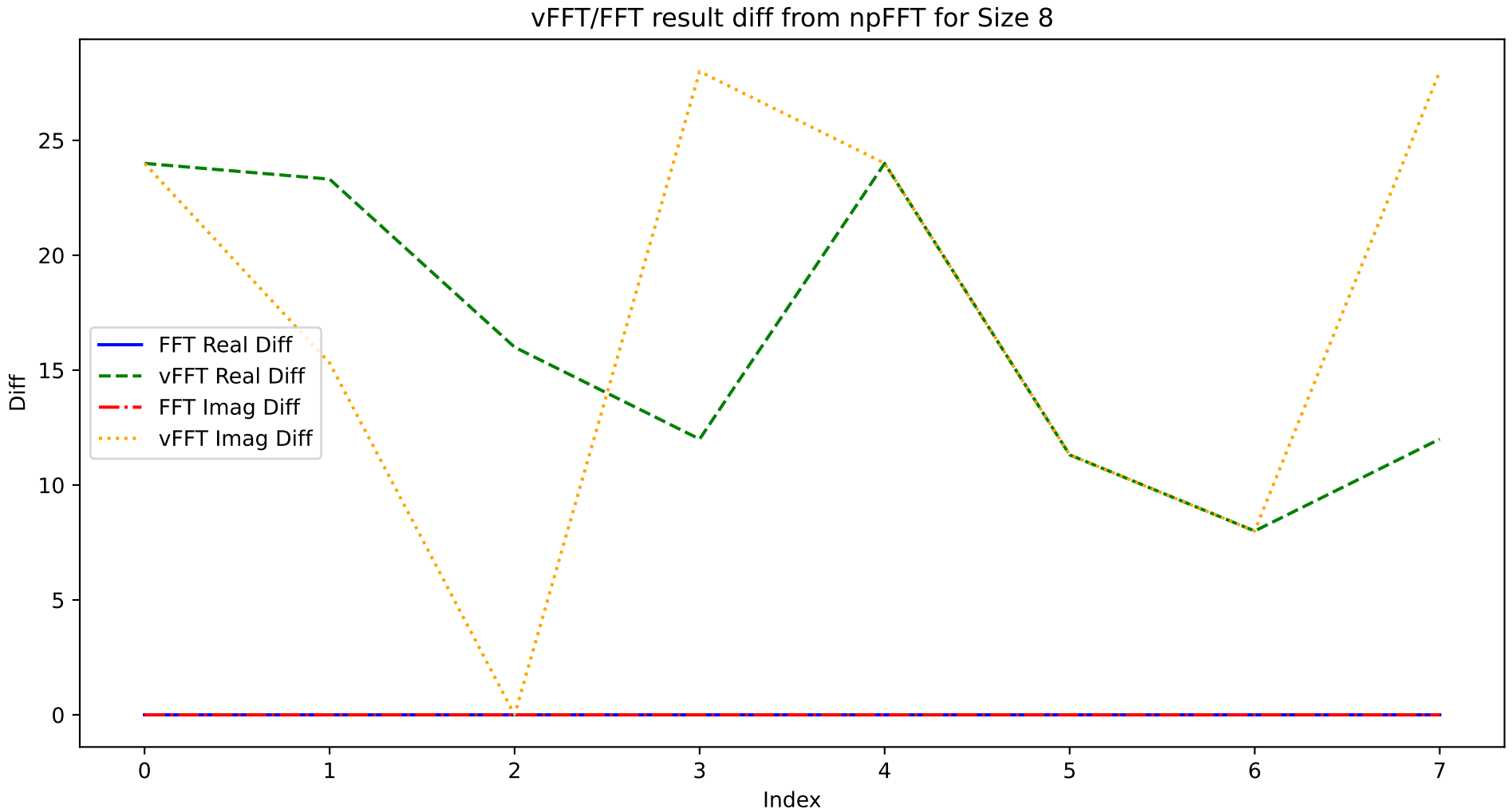

Instructions Count Difference Between FFT and vFFT
1e8
FFT Cycles
vFFT Cycles
VeeR Instruction Count
0
1
2
3
4
5
10^1
10^2
10^3
10^4
10^5
Input Size (log)

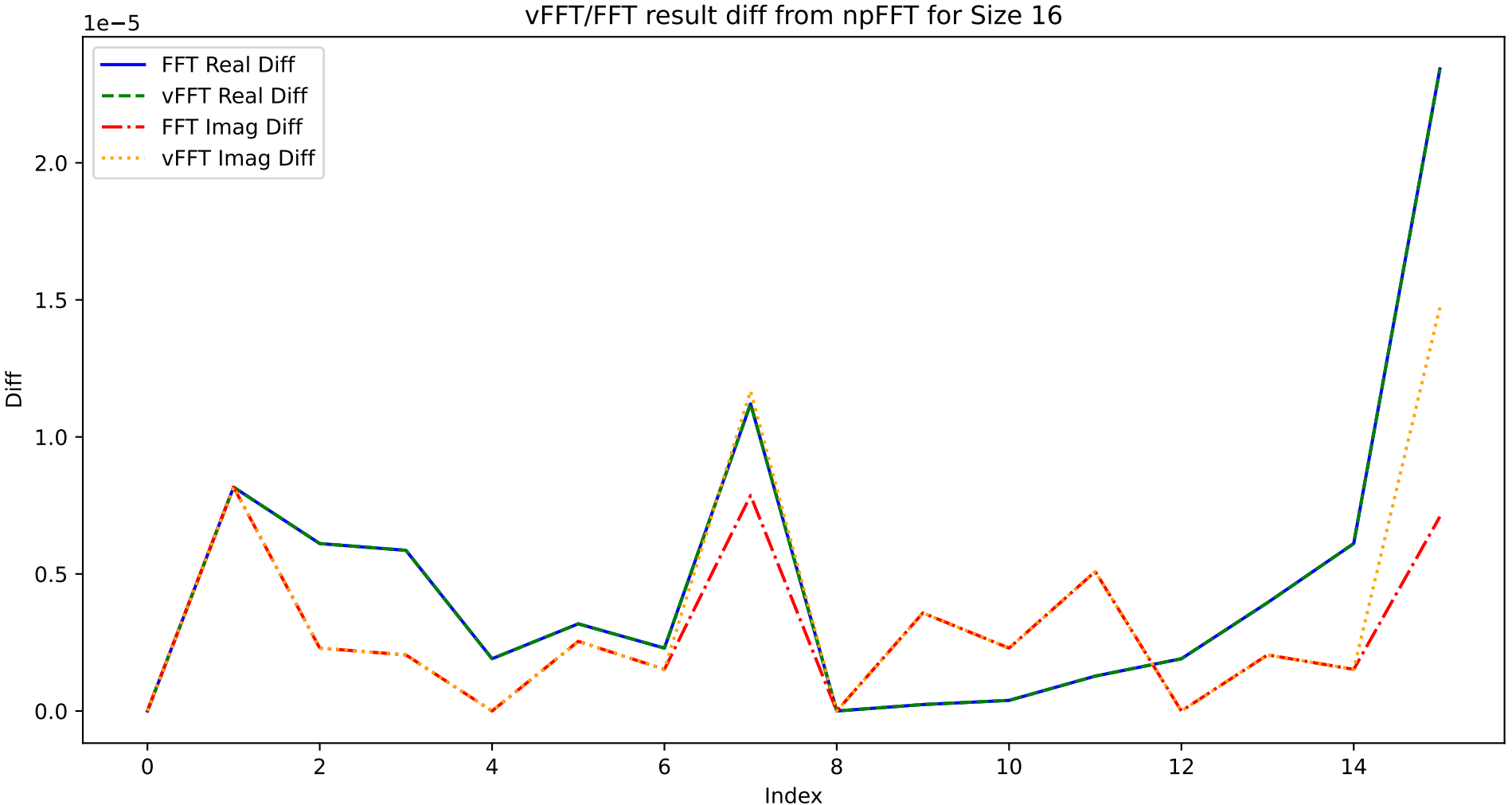

Instructions Count Difference Between FFT and vFFT With Big-O
1e11
FFT Cycles
vFFT Cycles
O(n*2)
O(n*logn)
VeeR Instruction Count
2.5
2.0
1.5
1.0
0.5
0.0
10^1
10^2
10^3
10^4
10^5
Input Size (log)

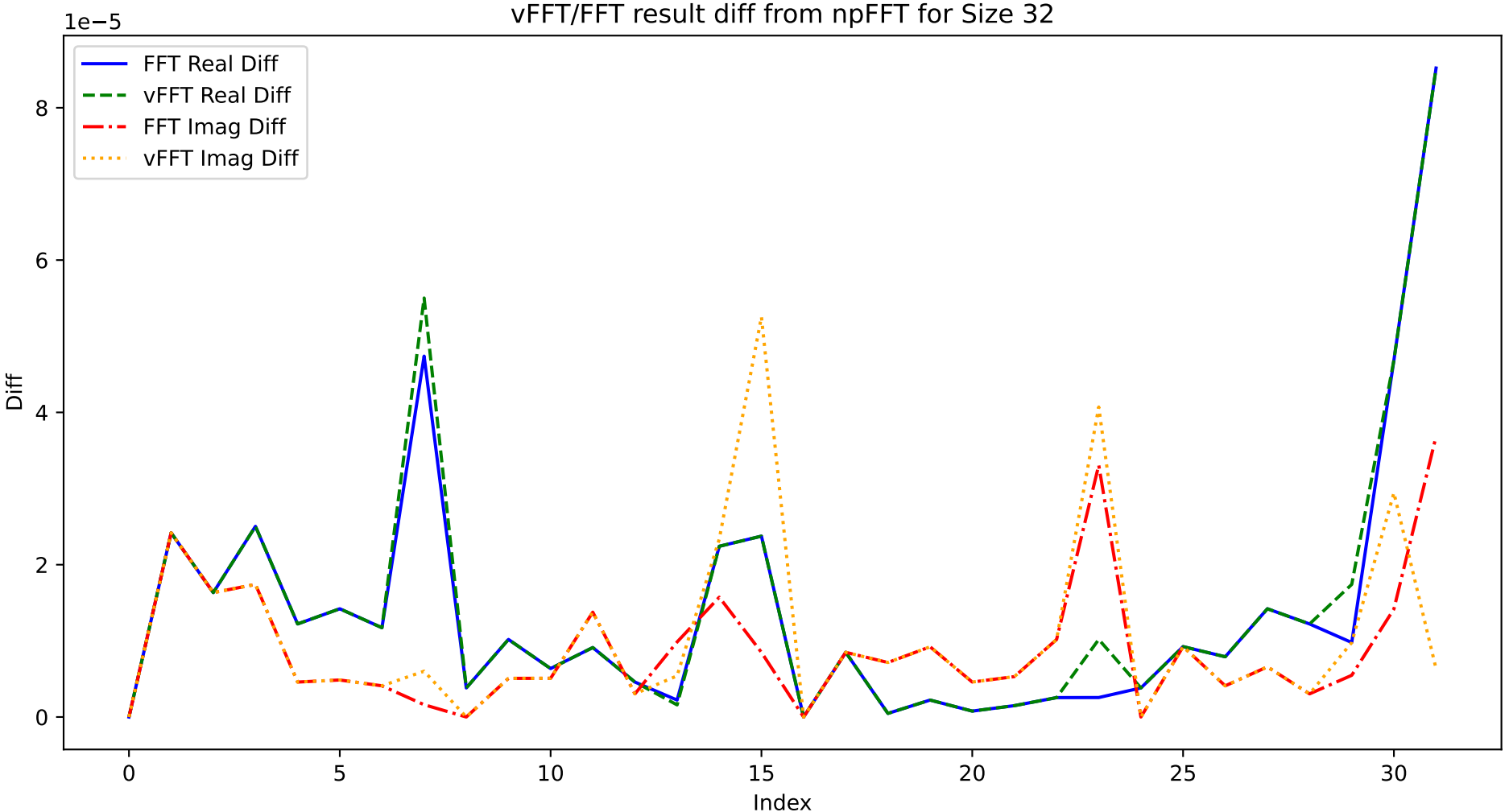

Runtime Difference Between npFFT, FFT and vFFT
npFFT time
FFT time
vFFT time
Run time in millisecond
2000
1500
1000
500
0
10^1
10^2
10^3
10^4
10^5
Input Size (log)

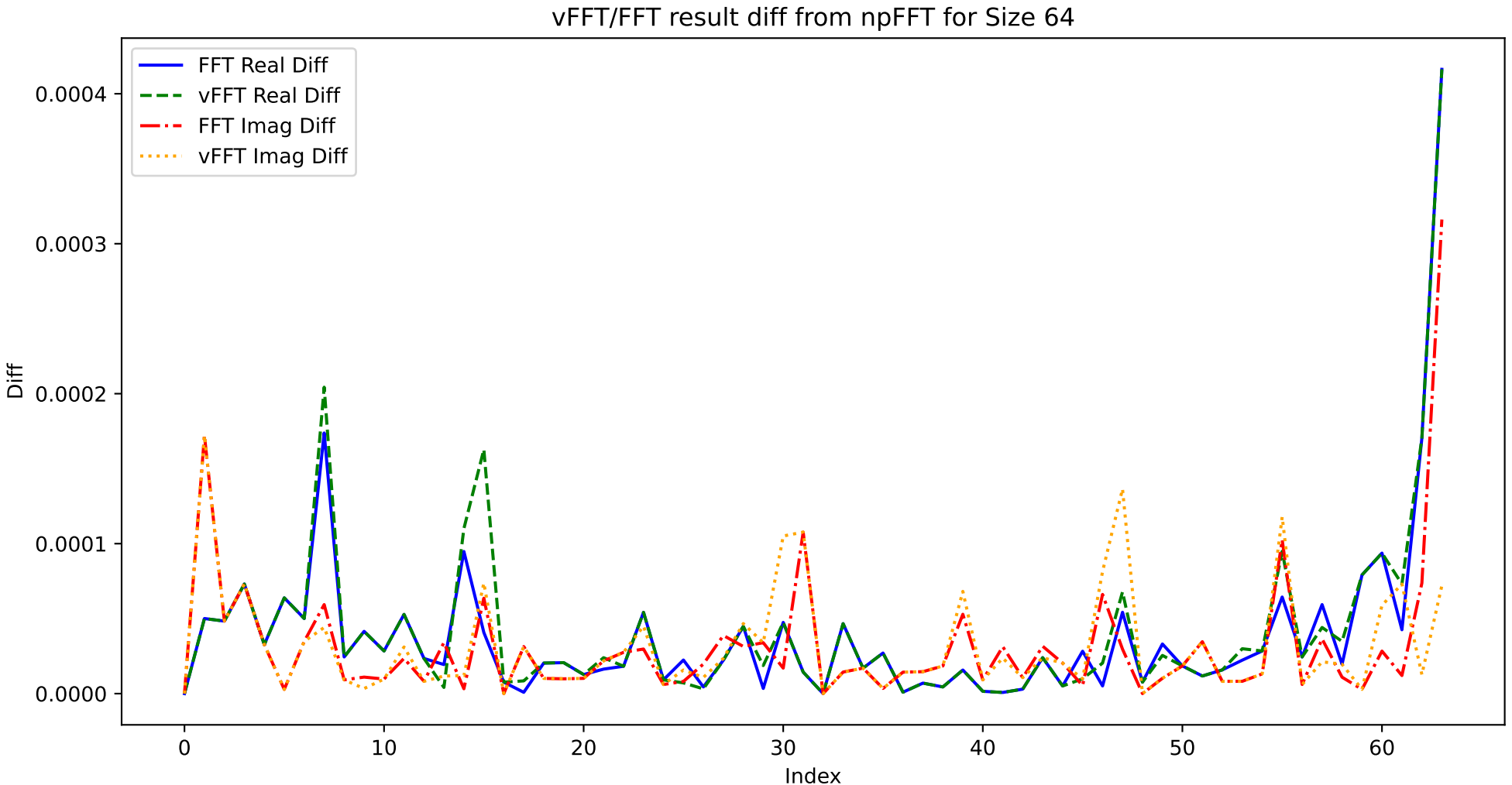

vFFT improvement over FFTs
vFFT Improvement
vIFFT Improvement
Ratio
Input Size (log)
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
10^1
10^2
10^3
10^4
10^5

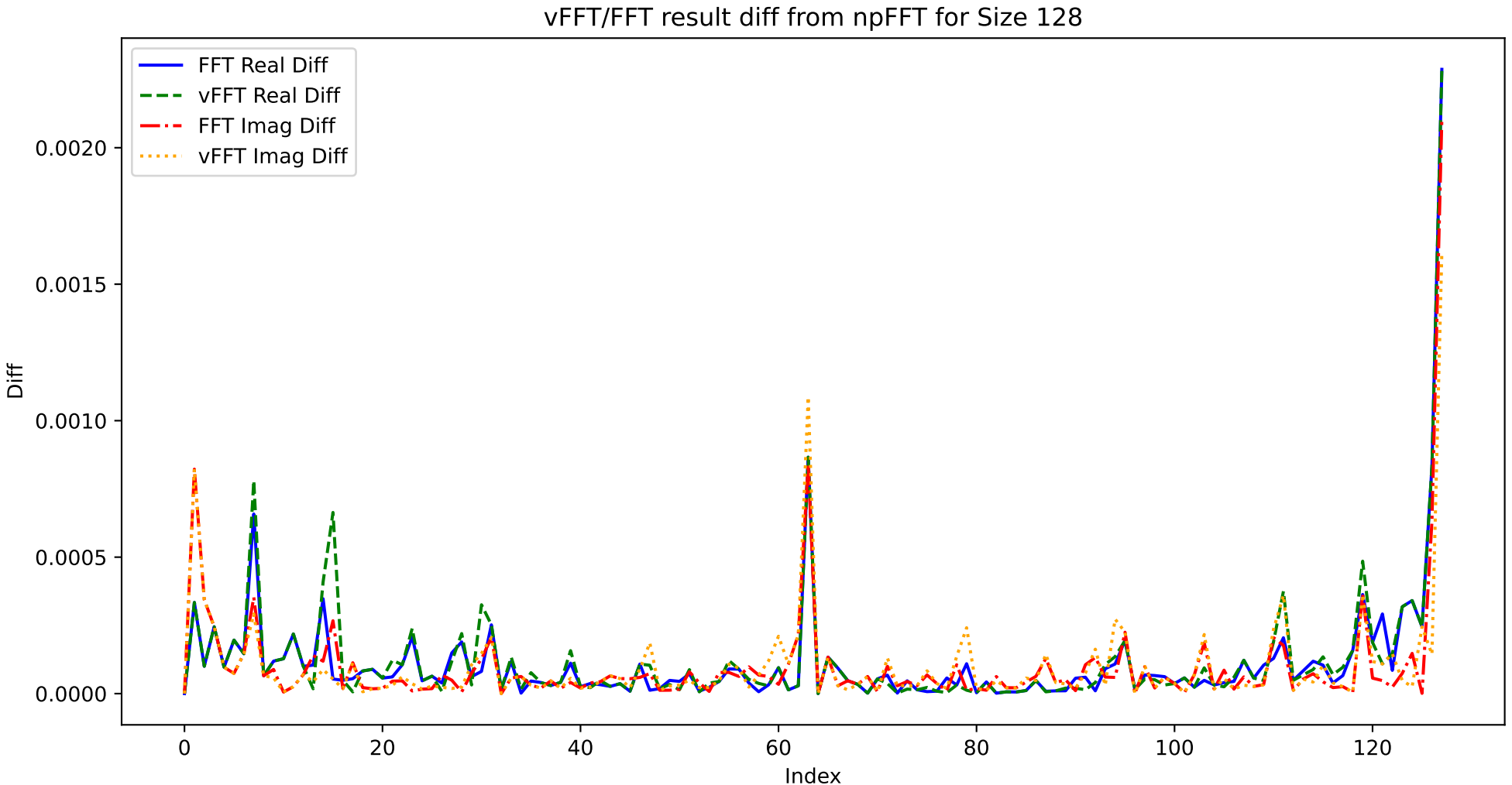

vFFT/FFT result diff from npFFT for Size 4
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
Index
0
2
4
6
8
10
12
14
0.0
0.5
1.0
1.5
2.0
2.5
3.0

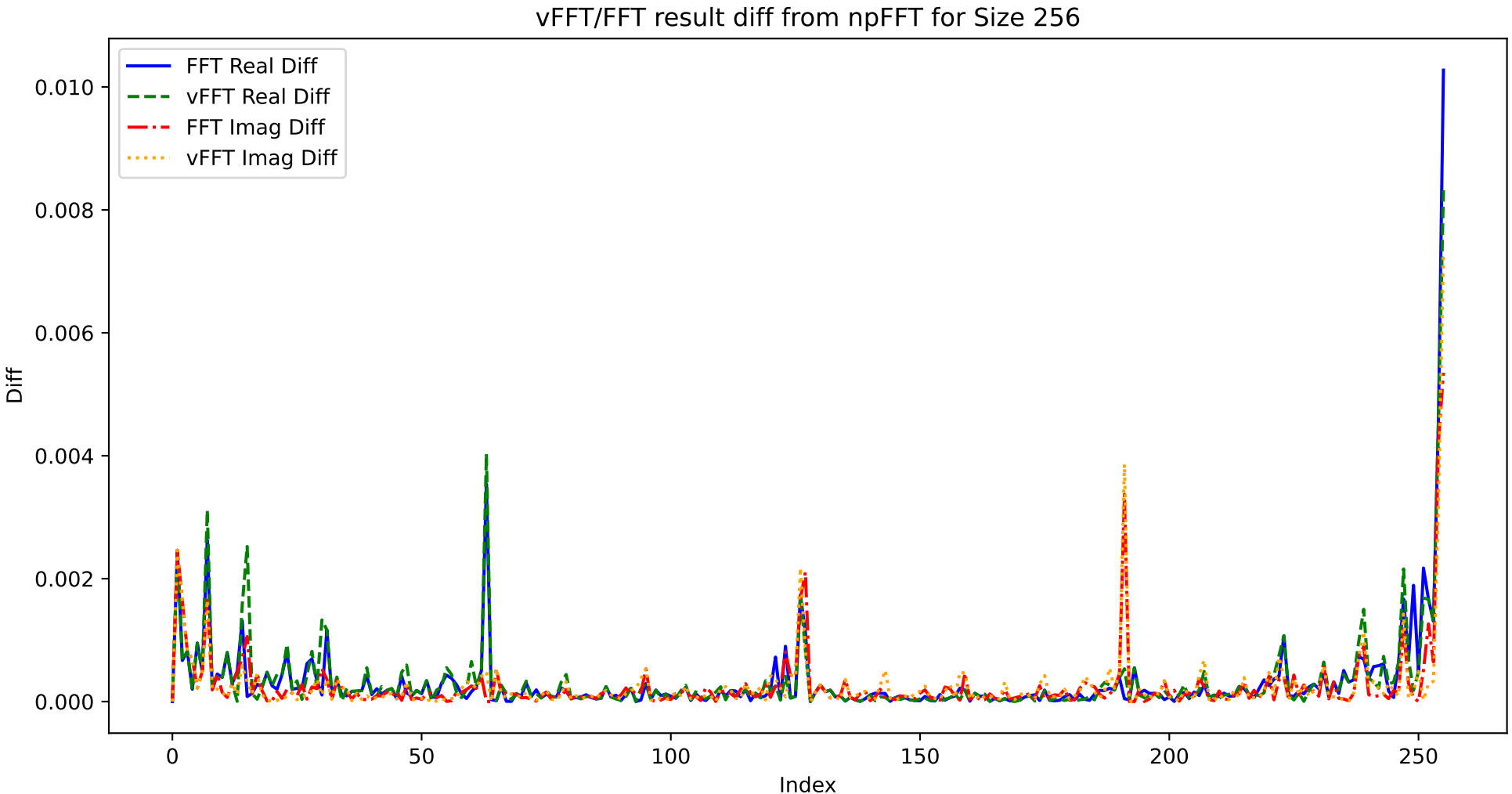

vFFT/FFT result diff from npFFT for Size 8
Diff
Index
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
0
5
10
15
20
25
0
1
2
3
4
5
6
7

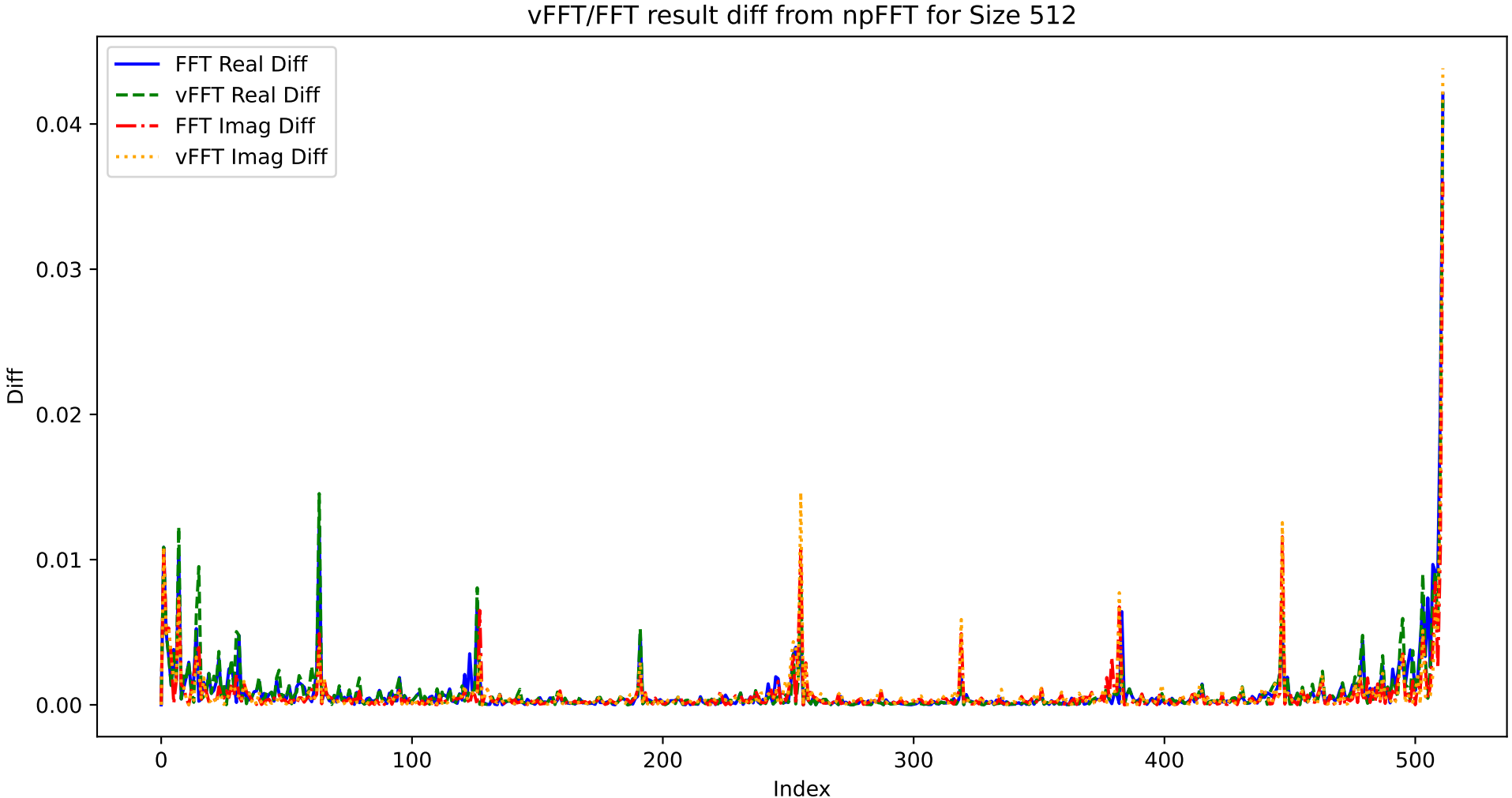

vFFT/FFT result diff from npFFT for Size 16
1e−5
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
2.0
1.5
1.0
0.5
0.0
0
2
4
6
8
10
12
14
Index

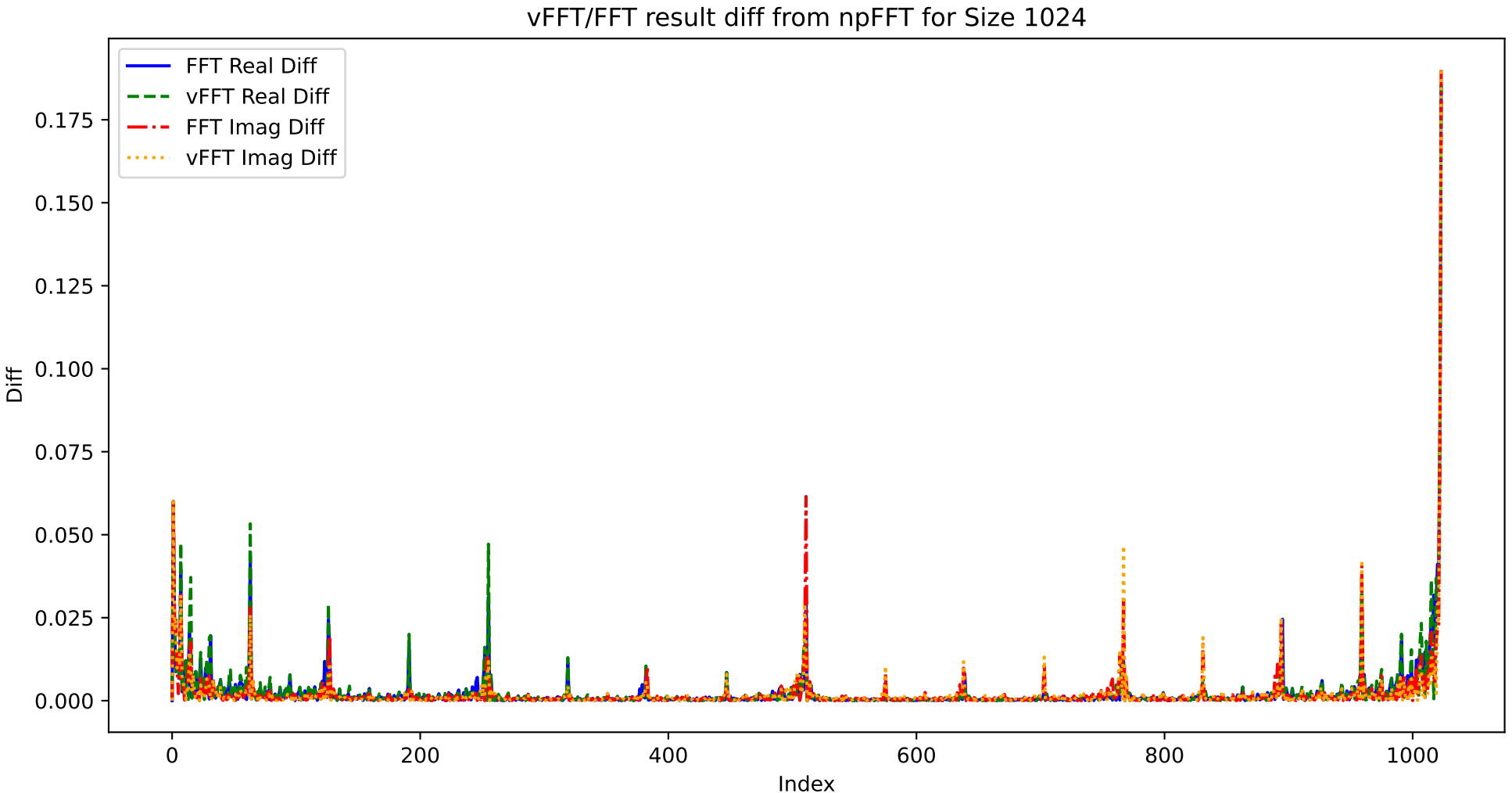

vFFT/FFT result diff from npFFT for Size 32
1e−5
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
Index
0
2
4
6
8
0
5
10
15
20
25
30

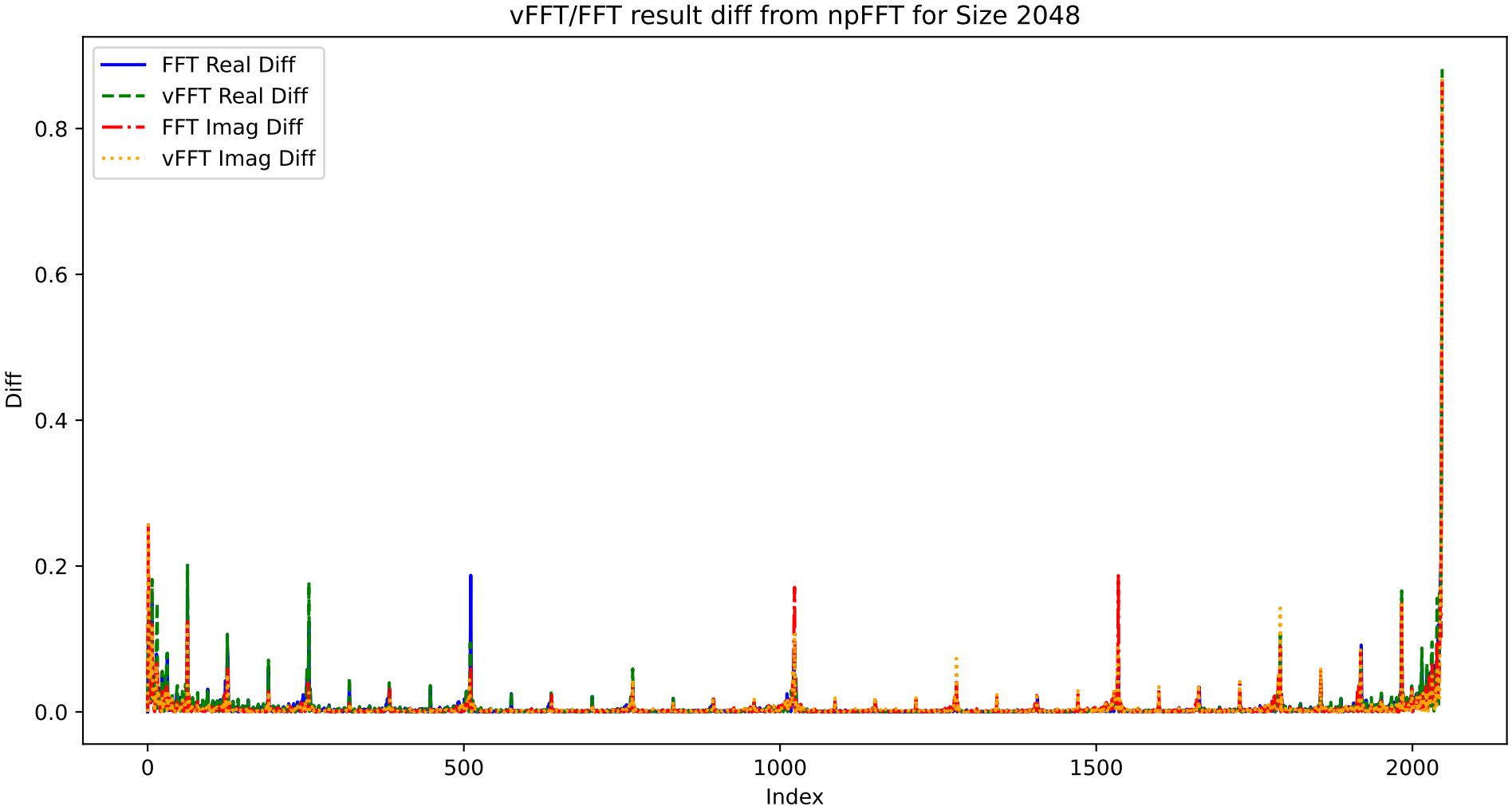

vFFT/FFT result diff from npFFT for Size 64
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0.0004
0.0003
0.0002
0.0001
0.0000
0
10
20
30
40
50
60
Index

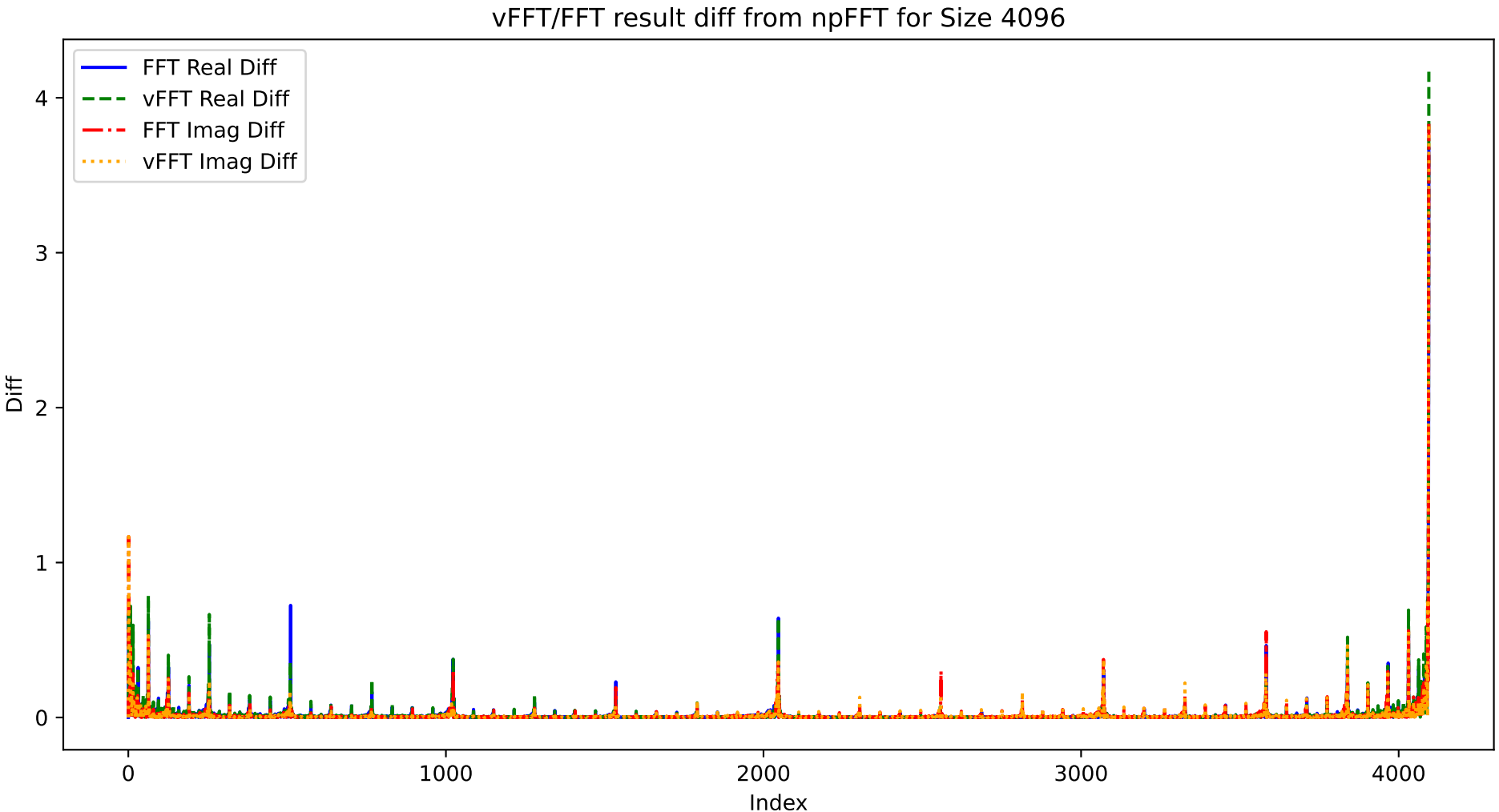

vFFT/FFT result diff from npFFT for Size 128
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0.0020
0.0015
0.0010
0.0005
0.0000
0
20
40
60
80
100
120
Index

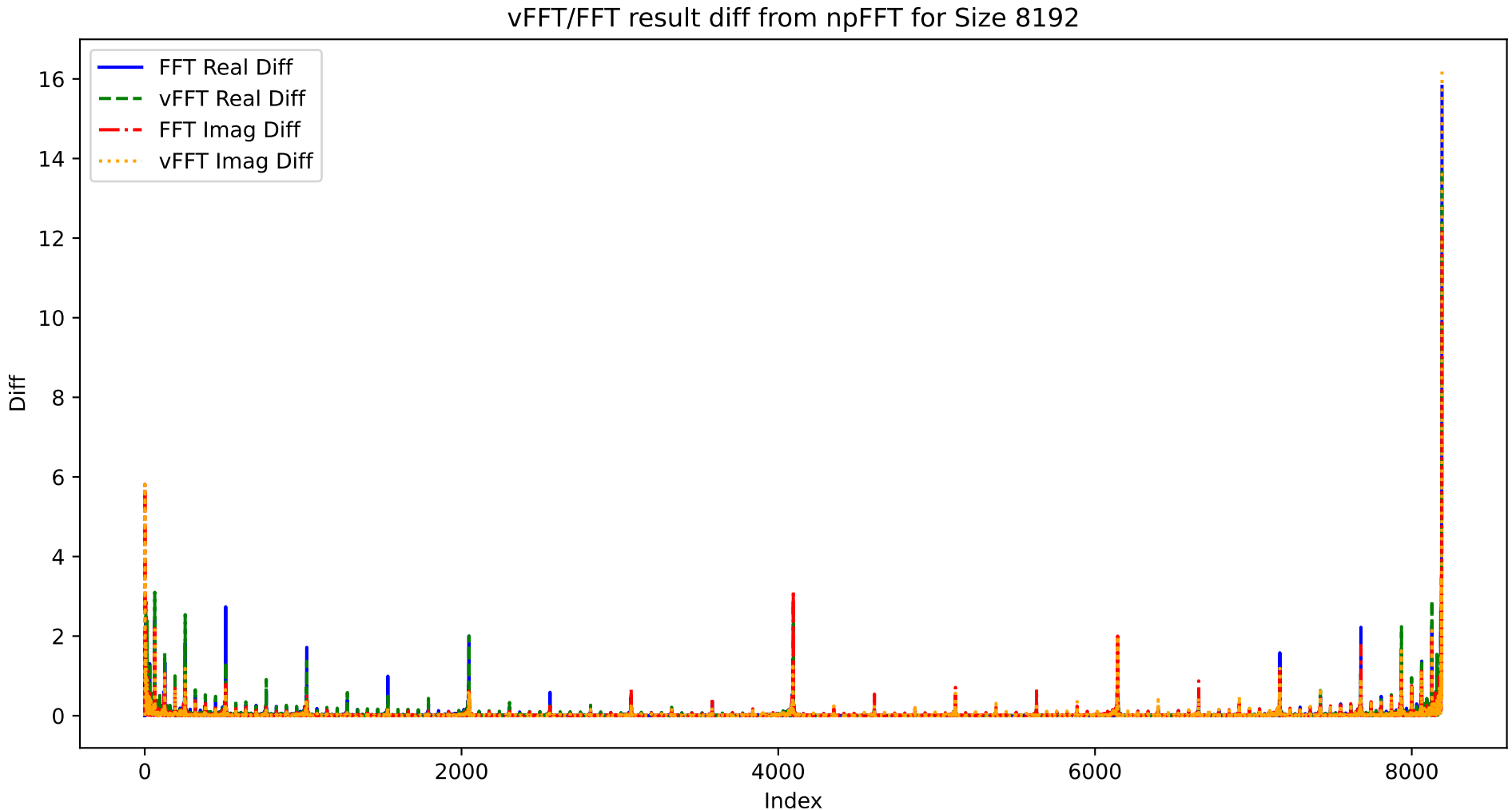

vFFT/FFT result diff from npFFT for Size 256
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0.010
0.008
0.006
0.004
0.002
0.000
0
50
100
150
200
250
Index

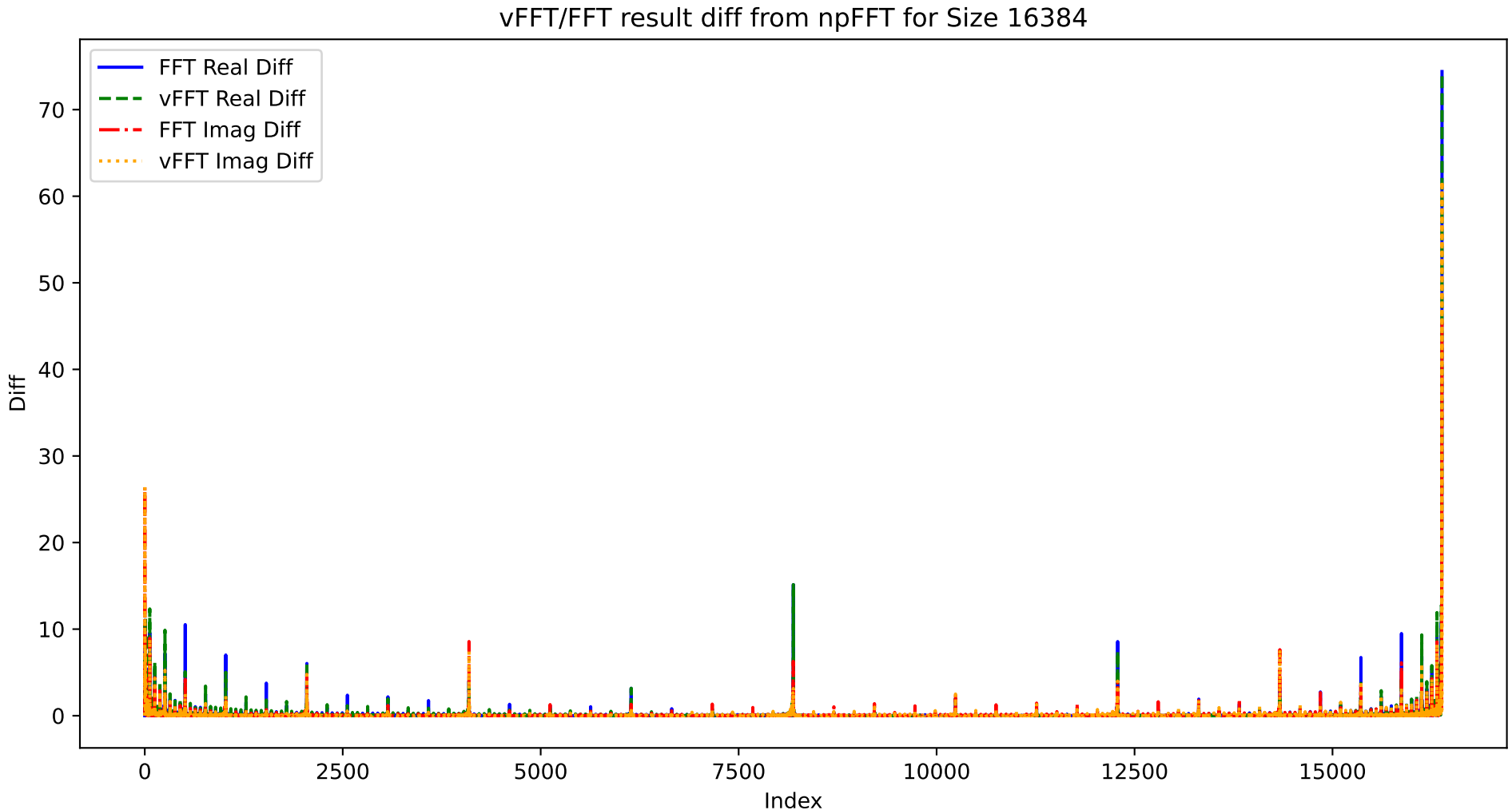

vFFT/FFT result diff from npFFT for Size 512
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0.00
0.01
0.02
0.03
0.04
0
100
200
300
400
500
Index

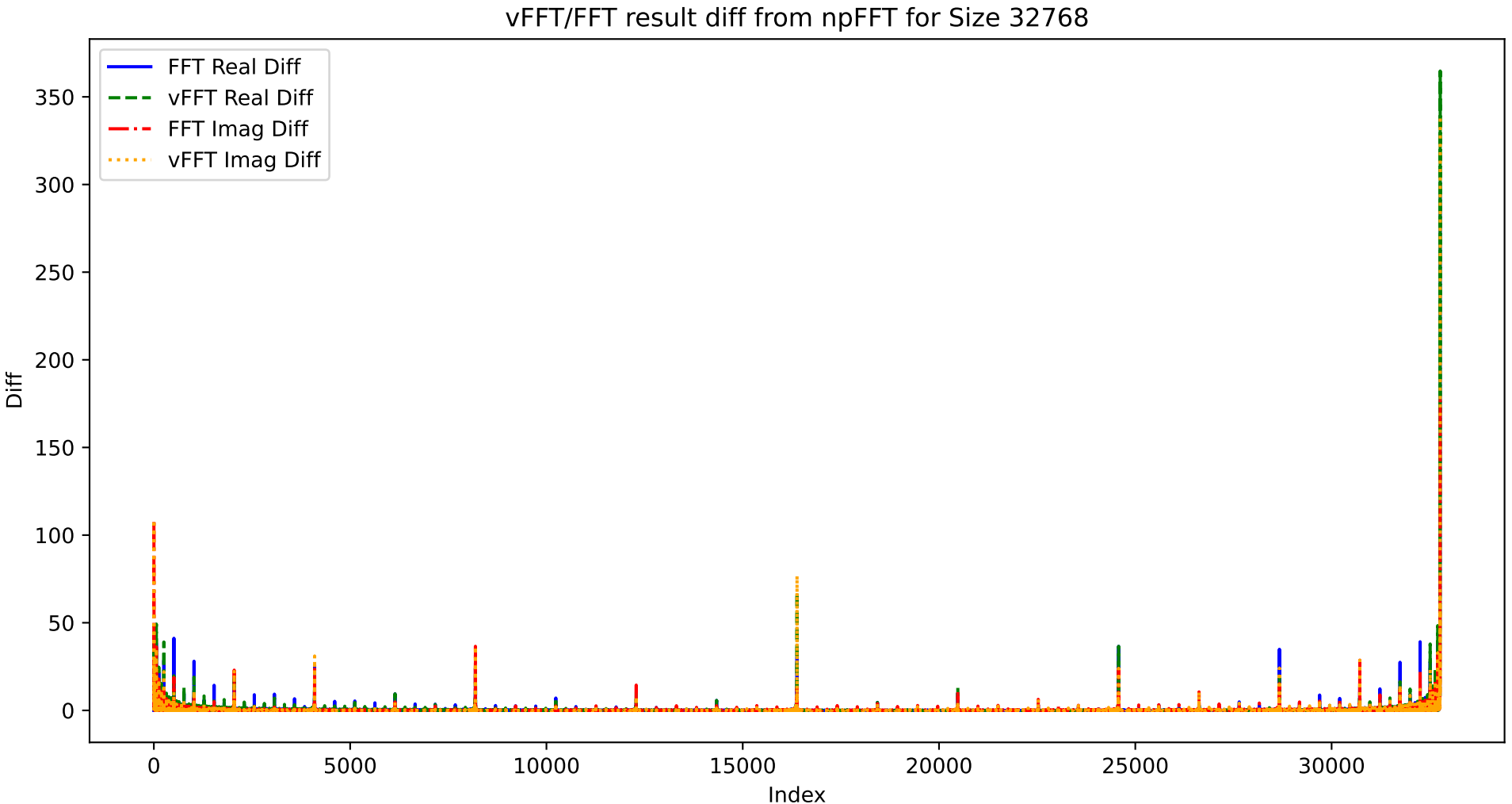

vFFT/FFT result diff from npFFT for Size 1024
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0
200
400
600
800
1000
Index

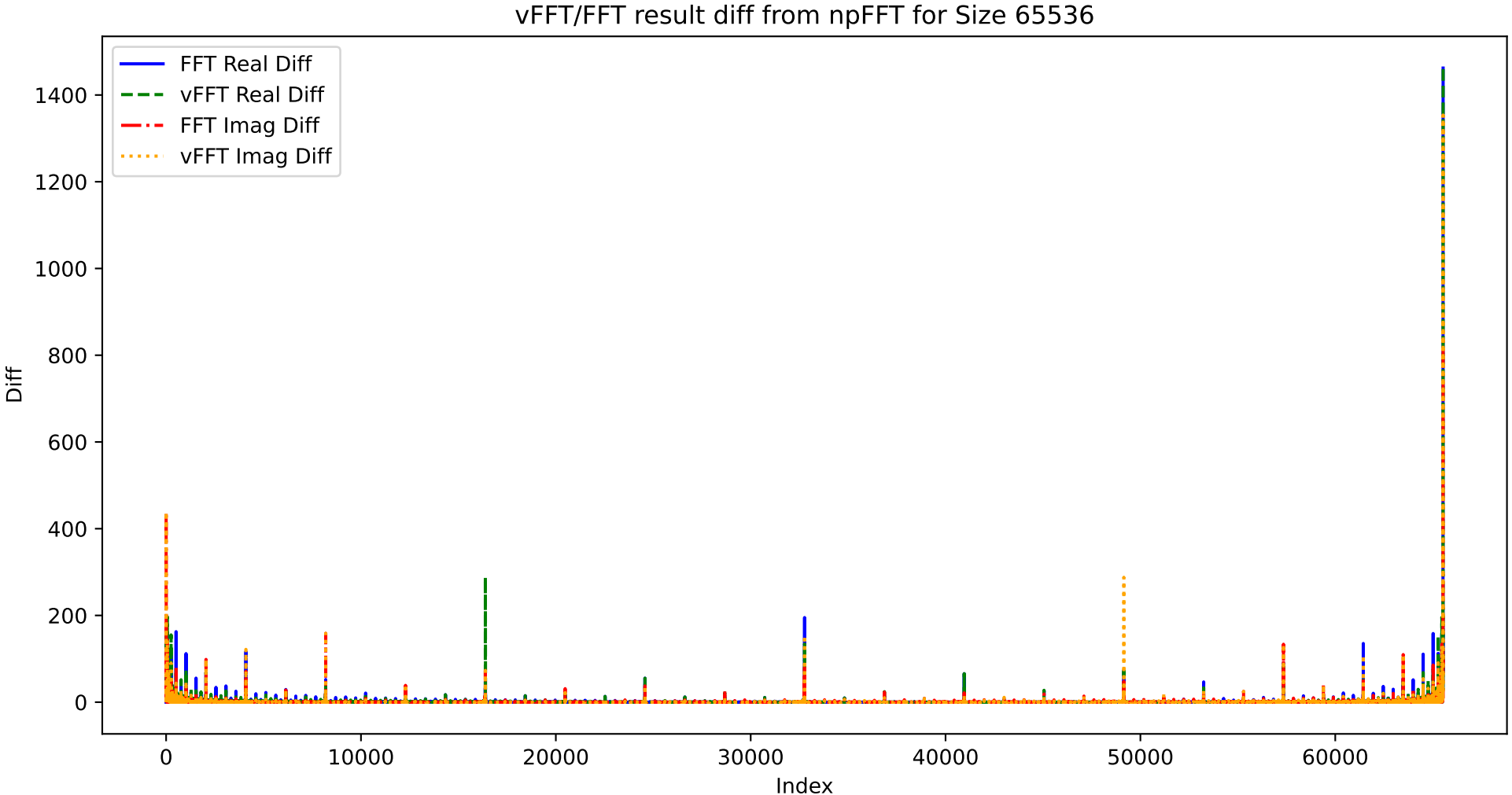

vFFT/FFT result diff from npFFT for Size 2048
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0.0
0.2
0.4
0.6
0.8
0
500
1000
1500
2000
Index

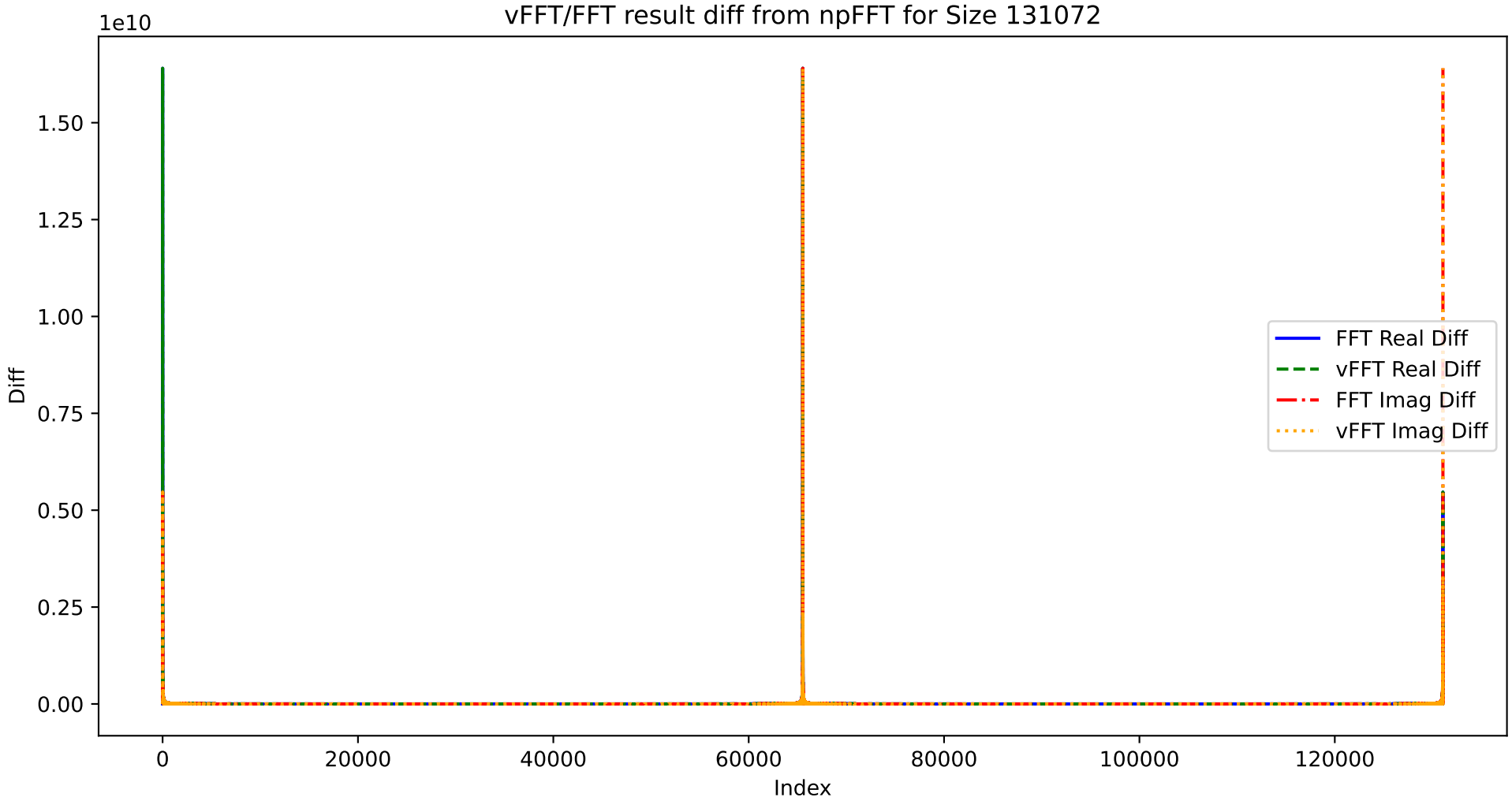

vFFT/FFT result diff from npFFT for Size 4096
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0
1
2
3
4
0
1000
2000
3000
4000
Index

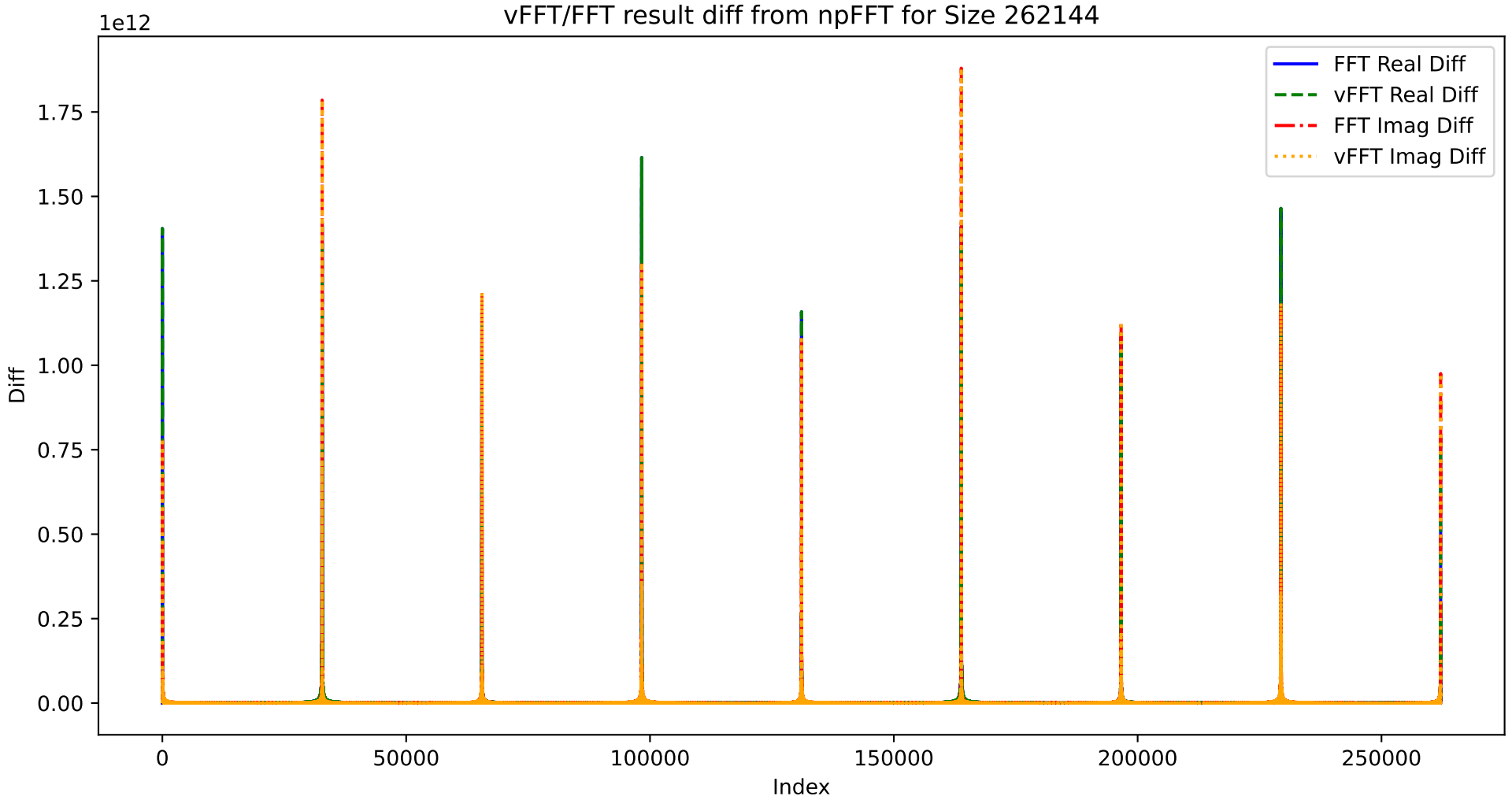

vFFT/FFT result diff from npFFT for Size 8192
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
Index
0
2
4
6
8
10
12
14
16
0
2000
4000
6000
8000

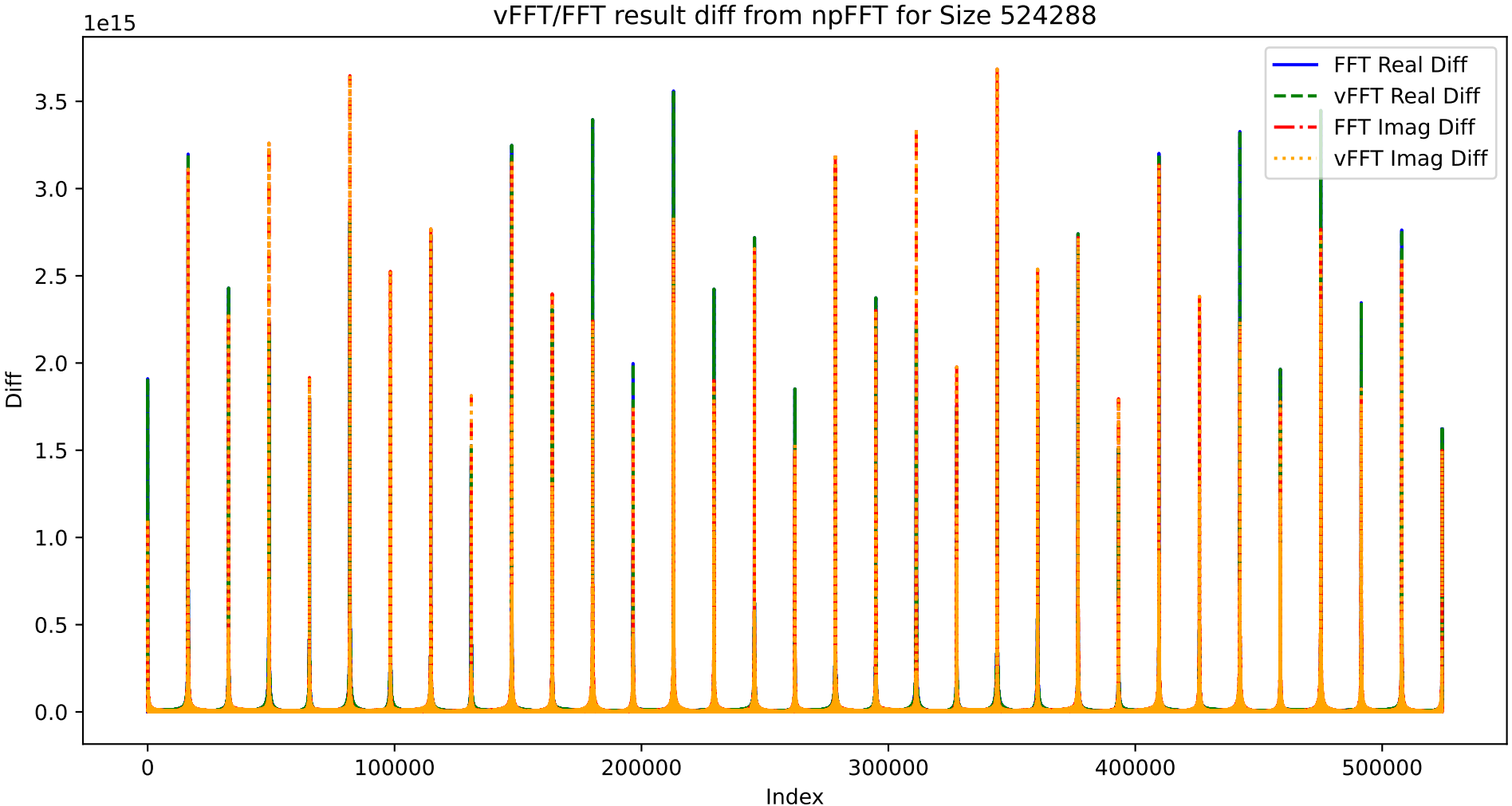

vFFT/FFT result diff from npFFT for Size 16384
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0
10
20
30
40
50
60
70
0
2500
5000
7500
10000
12500
15000
Index


vFFT/FFT result diff from npFFT for Size 32768
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0
50
100
150
200
250
300
350
0
5000
10000
15000
20000
25000
30000
Index


vFFT/FFT result diff from npFFT for Size 65536
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
Diff
0
200
400
600
800
1000
1200
1400
0
10000
20000
30000
40000
50000
60000
Index


vFFT/FFT result diff from npFFT for Size 131072
1e10
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Diff
0
20000
40000
60000
80000
100000
120000
Index
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff


vFFT/FFT result diff from npFFT for Size 262144
1e12
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
Diff
0
50000
100000
150000
200000
250000
Index
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff


vFFT/FFT result diff from npFFT for Size 524288
1e15
Diff
Index
FFT Real Diff
vFFT Real Diff
FFT Imag Diff
vFFT Imag Diff
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
100000
200000
300000
400000
500000