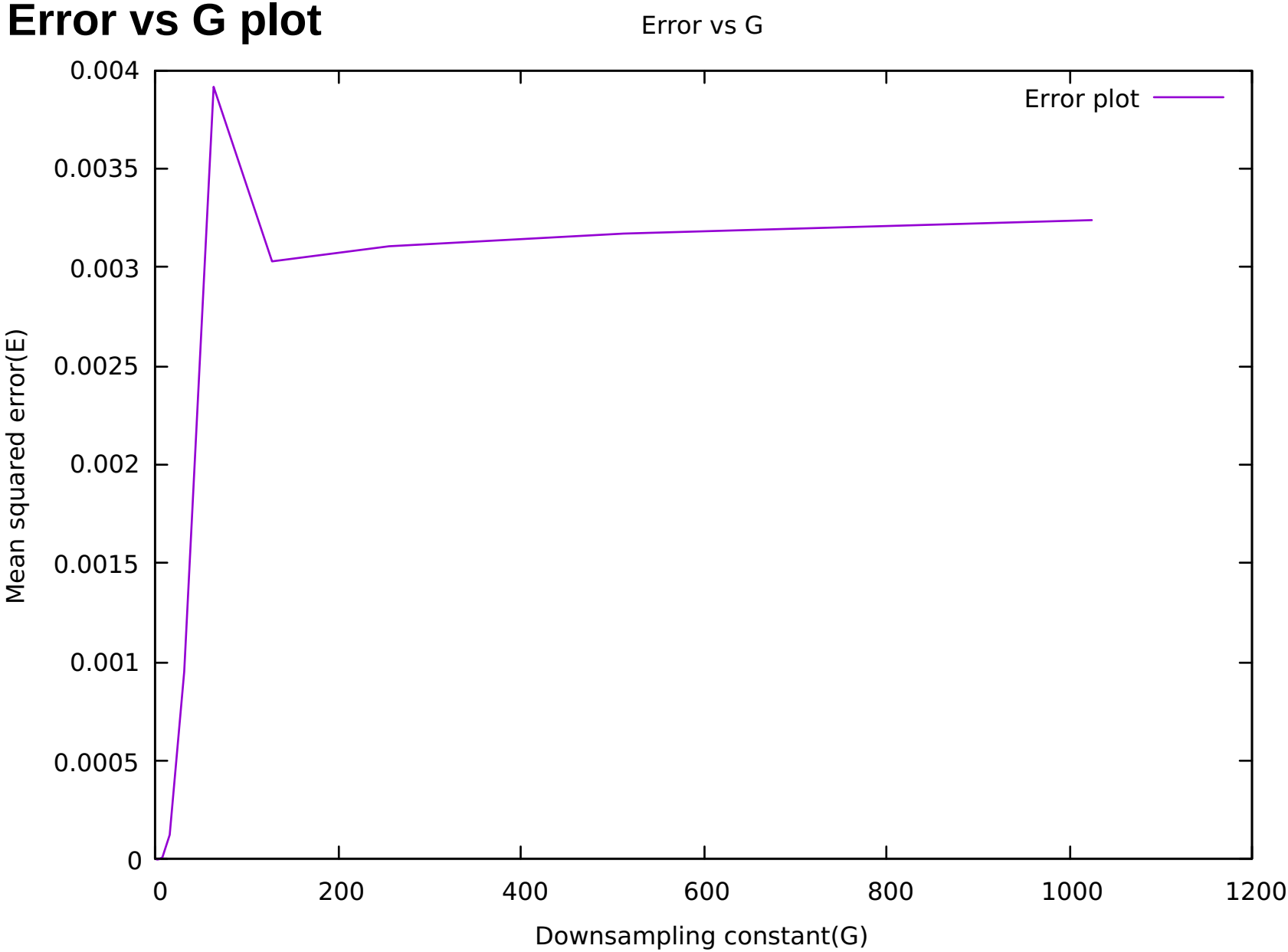
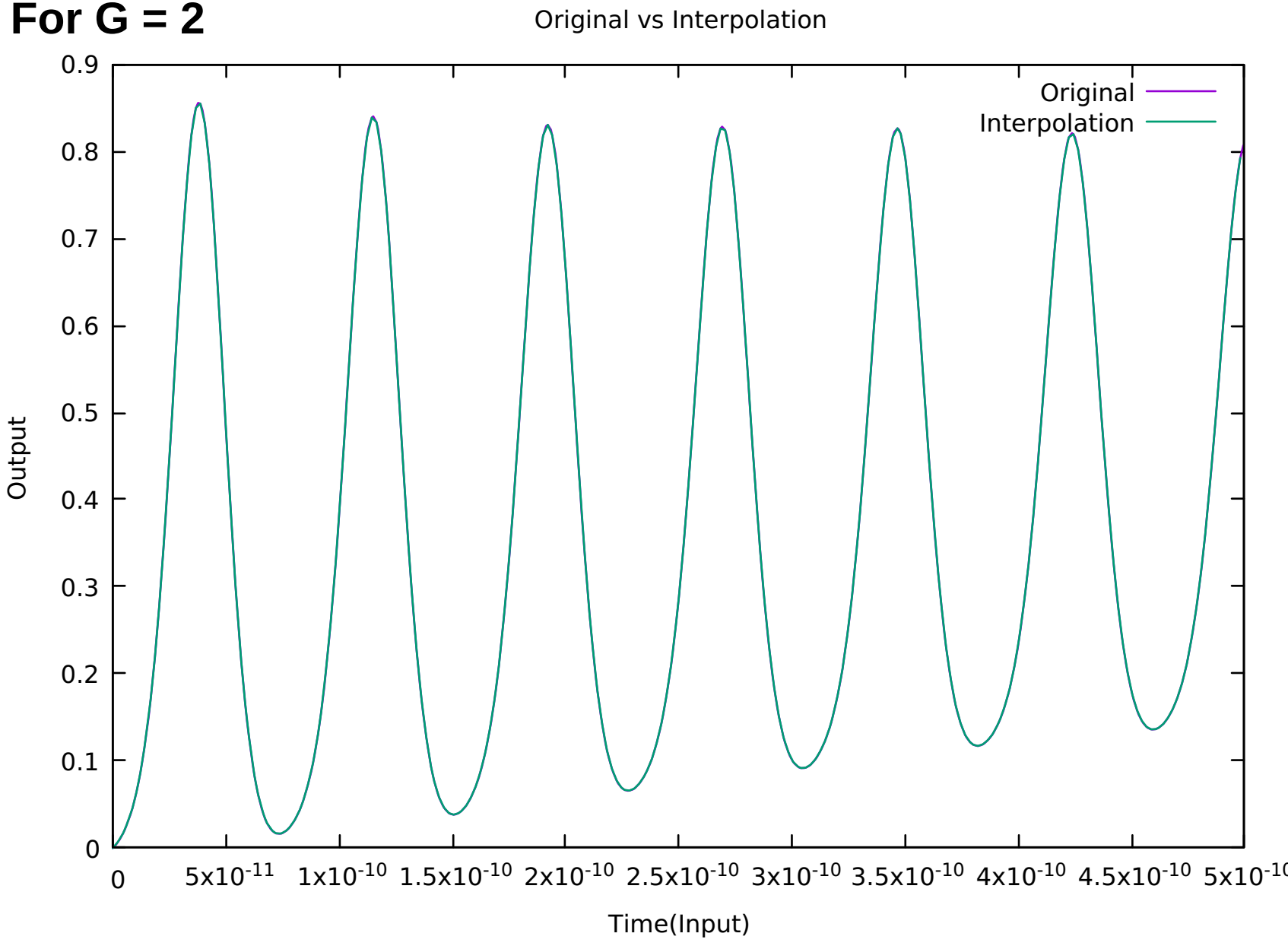
```bash
#!/bin/bash

awk '{print $1"\t"$2}' /home/ruban-vp/Desktop/assignment_2.txt > newdata.txt
#The file path of the datafile must be free of any spaces
# All the other files created when this bash script is run will be created in the present working diretory.
# So we don't need to specify their paths in the ./a.out command or the gnuplot command.

echo "" > errorplot.txt
gcc EE19B138_interp.c         #The interpolation code is compiled
for i in {1..10}
do
    var=$(( 2 ** i))
    ./a.out $var newdata.txt >> errorplot.txt
    #The executable file is ran for different downsampling constants (in this case they are the powers of 2 between 2 and 1024)
done

#For better visualisation, only the first 500 datapoints are used for plotting

# Original dataset
awk '{if(NR<502) print $1"\t"$2}' newdata.txt > original.txt
# Interpolation with g=2
awk '{if(NR<502 && (NR-2)%2==0) print $1"\t"$2}' newdata.txt > interpg2.txt
# Interpolation with g=16
awk '{if(NR<502 && (NR-2)%16==0) print $1"\t"$2}' newdata.txt > interpg16.txt
# Interpolation with g=128
awk '{if(NR<502 && (NR-2)%128==0) print $1"\t"$2}' newdata.txt > interpg128.txt

#The following commands are used to call the gnuplot commands within the bash script. The 'Error plot' and 'Original vs interpolation' plots for some downsampling
#constants are plotted using these commands
gnuplot -persist <<-EOFMarker
set title 'Error vs G'
set xlabel 'Downsampling constant(G)'
set ylabel 'Mean squared error(E)'
plot 'errorplot.txt' with lines title 'Error plot' linestyle 1
EOFMarker

for FILE in "interpg2.txt" "interpg16.txt" "interpg128.txt"
do
    gnuplot -persist <<-EOFMarker
    set title 'Original vs Interpolation'
    set xlabel 'Time(Input)'
    set ylabel 'Output'
    plot 'original.txt' with lines title 'Original' linestyle 1, \
    '$FILE' with lines title 'Interpolation' linestyle 2
    EOFMarker
done
```

Bash script

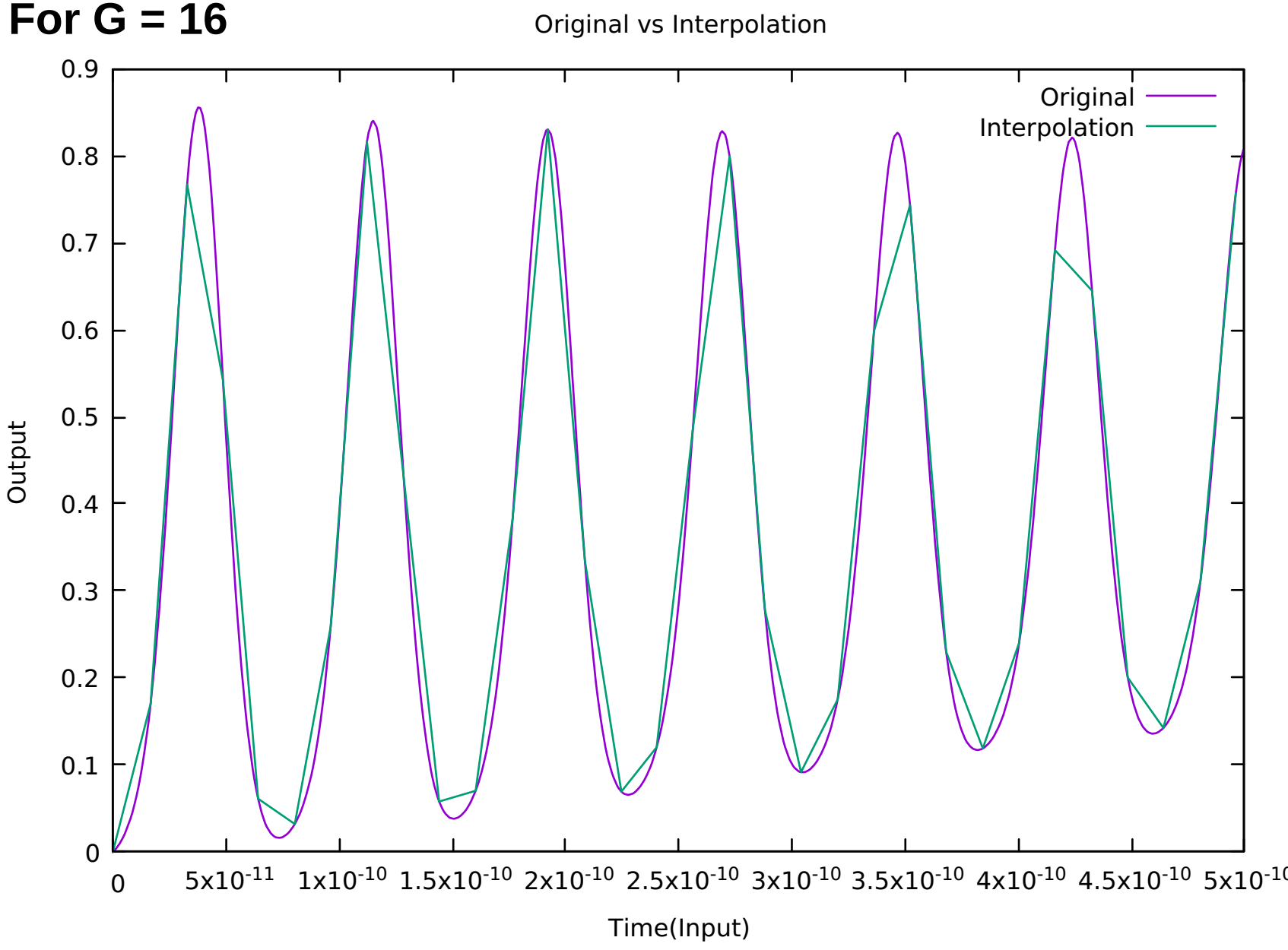
Error vs G plot



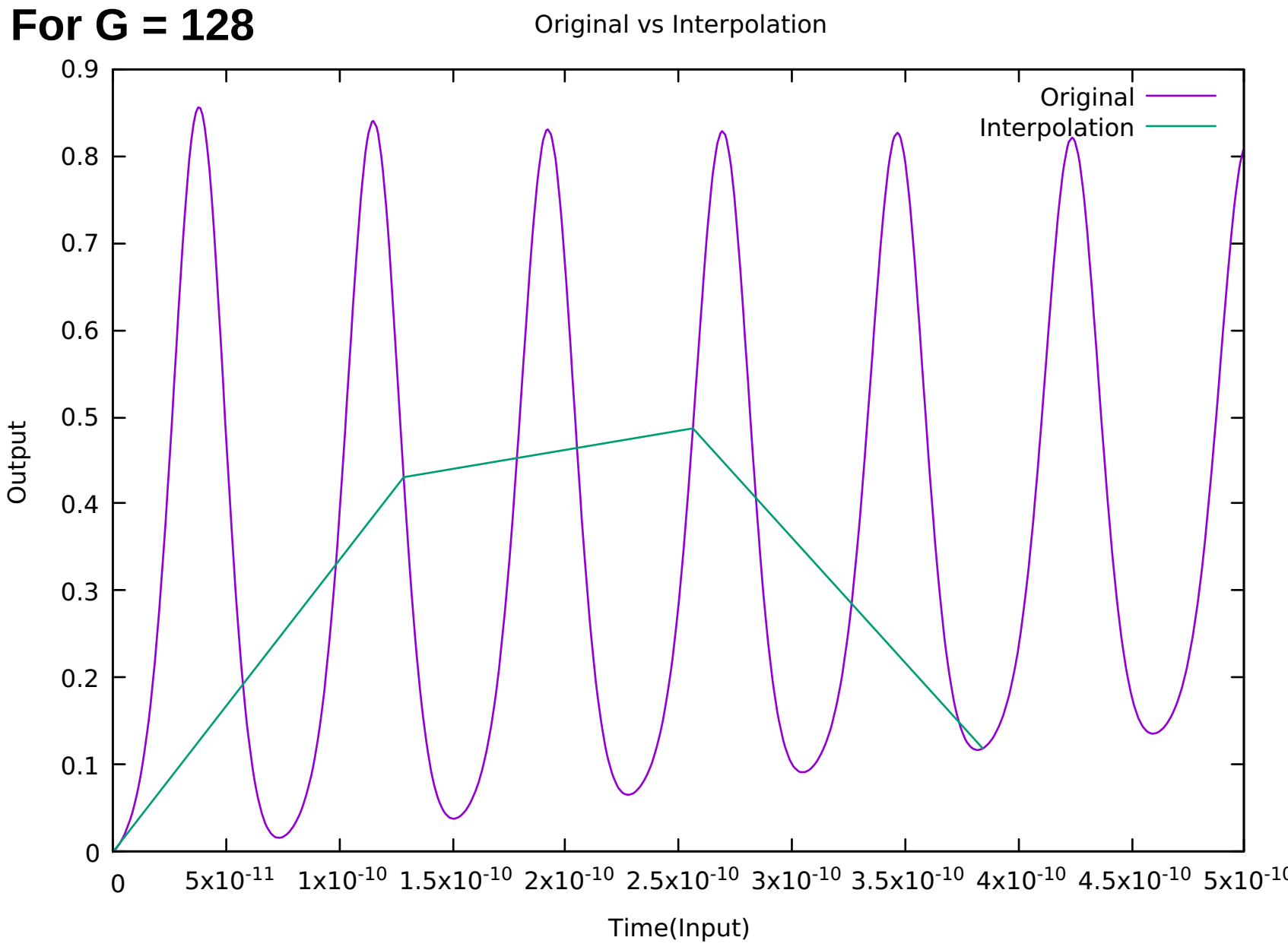
For G = 2


Original vs Interpolation
Original
Interpolation
Output
Time(Input)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0
5x10-11
1x10-10
1.5x10-10
2x10-10
2.5x10-10
3x10-10
3.5x10-10
4x10-10
4.5x10-10
5x10-10

For G = 16


Original vs Interpolation
Original
Interpolation
Output
Time(Input)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0
5x10-11
1x10-10
1.5x10-10
2x10-10
2.5x10-10
3x10-10
3.5x10-10
4x10-10
4.5x10-10
5x10-10

For G = 128


Original vs Interpolation
Original
Interpolation
Output
Time(Input)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0
5x10-11
1x10-10
1.5x10-10
2x10-10
2.5x10-10
3x10-10
3.5x10-10
4x10-10
4.5x10-10
5x10-10