Computing Assignment 1

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D100

Chart, line chart

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Description automatically generateda) **Figure 1 Figure 2 Figure 3**

Here I plotted the difference between x and y as a curve for N = 40, 50 and 60 respectively. I noticed that as N increases, the difference between x and y increases. Also, I noticed for higher values of x and y, the difference between x and y increases in a non-linear fashion. This suggests that this algorithm is not robust at keeping x equal to y

Chart, line chart

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Description automatically generatedb) Here I noticed that between n=30 and n=40 the x and y values begin to differ, so I tried a few values and pinpointed n=34 to be approximately the point where the x and y difference becomes noticeable:

c) As seen in part a, the limiting behavior of the algorithm results in x and y becoming wildly differing values, suggesting an amplification of roundoff error. As such it is suggested that the limiting behavior as n approaches infinity of this algorithm results in infinite error, and y converges at 1.

d) As mentioned in part c, the amplification of roundoff error causes the absolute error between x and y to increase. This can be seen in figure 2 of part a, as the graph skews further from a linear curve as the values of x and y increase.