CSc 30100

Assignment due March 3, 2020

Calculate the Taylor polynomials centered at 0,

$$T_n(x) = \sum_{k=0}^{n} \frac{f^{(k)}(0)}{k!}(x)^k$$

for $f = \sin(x)$ for the following 16 values of x,

$x \in \left\{0, \frac{2\pi}{16}, \frac{4\pi}{16}, \frac{6\pi}{16}, ..., \frac{30\pi}{16}, \frac{32\pi}{16}\right\}$ which is equivalent to

$x = \frac{k}{16}(2\pi),$ for $k = 0,1,2,...,15,16.$

For each value of k, find the smallest integer n such that

$$\left| T_n\left(\frac{2\pi k}{16}\right) - \sin\left(\frac{2\pi k}{16}\right) \right| < 10^{-14}.$$

Present your results in a table and discuss them. Include all of your analysis and discussion in an .ipynb file and submit the file thorugh Blackboard.

The name of the file you submit should be

lastname_firstname_AS04.ipynb.

Do not clear your results after your last run so that I will be able to see your results without rerunning your file.

If you collaborate with anyone on this assignment, be sure to follow the collaboration guidelines in the syllabus including listing with whom you collaborated in your ipynb file.