CHEN.3170 Applied Engineering Problem Solving

A Short Quiz on
Using Looping Structures within Matlab

The value of π can be estimated by the following infinite series

$$S = \sum_{k=0}^{N} \frac{1}{16^k} \left(\frac{4}{8k+1} - \frac{2}{8k+4} - \frac{1}{8k+5} - \frac{1}{8k+6} \right)$$

where $S \to \pi$ as $N \to \infty$. Using this expression write a short Matlab script file that continues to add more terms in the series until the relative contribution of the next term is less than 10^{-8}. That is, what is the value of N needed to give a relative accuracy of about 10^{-8} for the value of π? Simply print the final values of S and N to the screen.

Note: Do not use the built-in *pi* function in your Matlab code -- assume we do not know this value and that the above series expansion is to be used to estimate the actual value of π.