MAT 116E Advanced Scientific and Engineering Computing
Lab-7 / CRN : 12852

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1   Question 1

Write a user defined function that determines cos(x) using Taylor's series expansion. For function name and arguments, use $y = cosTay(x)$, where the input argument x is the angle in radian and the output argument y is the value for $cos(x)$ Inside the user-defined function, use a loop for adding the terms of the Taylor's series. If a_n is the n-term in the series, then the sum $S_n = S_{n-1} + a_n$. In each pass, calculate the estimated error E given by $E = \dfrac{|S_n - S_{n-1}|}{|S_n|}$. Stop adding terms when $E \leq 0.000001$.

Taylor Series expansion of $cos(x)$ about $x = 0$ is given as

$$cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!} x^{2n}$$

2   Question 2

You are asked to decrypt an encrypted image via MATLAB. Let E be the encrypted image and I be the original image. The encryption process has been carried out as follows.

$$E(i, j, k) = \begin{cases} 4 * I(i, j, k) + 127 \ (\text{mod } 100), & \text{if i+j is even number} \\ 4 * I(i, j, k) + 255 \ (\text{mod } 200), & \text{if i+j is odd number} \end{cases}$$

Write a Matlab function named **decryptImage** that takes the encrypted image and division values given in ninova and returns decrypted image.