

Workshop on Scilab

Funded by the National Mission on Education through ICT

Jointly organized by

Bhaskaracharya Pratishthana, Pune and IIT, Bombay

venue: **Bhaskaracharya Pratishthana**

www.bprim.org

4 - 7 July, 2009

Assignment-III

Part -I

1. Apply the Newton Raphson to find the root of the equation $x^3 - 5x + 4 = 0$ with trail value 5.
2. Let $f(x) = (x - 2)^4$.
 - (a) Find the Newton Raphson formula.
 - (b) Start with $x_0 = 2.1$ and compute x_1, x_2, x_3 , and x_4 .
3. Find a real solution of the equation $x^4 - x - 10 = 0$ lying between 1.8 and 2 by Regula Falsi Method. Use three integration.
4. Use Regula Falsi Method to obtain roots of the following correct to five decimal places.
 - (a) $x^3 + 7x^2 + 9 = 0$
 - (b) $x^3 + x^2 + x + 7 = 0$

Part -II

1. Define

$T = \text{rand}(3, 3)$

and $a = [4 \ 5 \ 6]$. Construct diagonal matrix D_a with entries a on diagonal. Check if $T^{-1}D_aT$ has eigen values $= a$?

$$\begin{aligned}\det(T^{-1}D_aT) &= \text{prod}(a)? \quad (\text{product}) \\ \text{trace}(T^{-1}D_aT) &= \text{sum}(a)\end{aligned}$$

2. Find $\text{rank}(A)$ with $A = \begin{bmatrix} 1000 & 0 \\ 0 & 0.0001 \end{bmatrix}$. Find $\text{rank}(A, 0.01)$
3. $A = \text{rand}(3, 3)$, $p(s) = \det(SI - A)$, $a = \text{coefficients of } p$. Check that

$$a(1)I + a(2)A + \cdots + a(n+1)A^n = 0$$

(Cayley Hamilton theorem).

4. Let $a = \text{rand}(3, 3)$

$$\text{Construct } A = \begin{bmatrix} 0 & I_{n-1} \\ -a & \end{bmatrix}$$