..a University   Computer Application
.alty of Engineering   2nd year
Mechanical Power Eng. Dept.   Time :3 hr

Attempt to solve all Questions and write a flow chart for all program

Question (1)   [15]

1-a)Write a computer program to get the area under the curve using trapezoidal rule
$P=0.22 V^2 - 0.4 v^4+3$ From v=1 to v=2 with step equal 0.1 where

$$w = \int_{1}^{2} pdv$$

1-b) write a computer program to solve the equation $aX^2+bX+c=0$

At a=4, b=5 , c=-4

Question (2)   [10]

2-a) write a computer program to calculate the root of the following non- linear equation using Newton – Raphson method $(X-0.2\sin X-0.5X^3=5)$ using the first gauss X=0.1 and the error equal 0.0001

2-b) write a computer program to calculate the root of the following non- linear equation using Bi-section method $(Xe^X-0.2\tan X-0.5X^3=15)$ using the first gauss X=0.1 and X=1.5 and the error equal 0.0001

Question (3)   [10]

Write a computer program to calculate the arithmetic mean value of X if the input data are $x_1,x_2,x_3,\ldots\ldots\ldots\ldots x_{n-1},x_n$ if n is equal 100 and then write subroutine to calculate the standard deviation SD where the arithmetic mean value of X equal the sum of all data divided to total number of data

Question (4)   [15]
Write a computer program to determine a root of cubic equation $AX^3+BX^2+CX+D=0.0$

Question (5)   [10]

Write a computer program to get root of the surface configuration of the NACA 0012 airfoil of Length 1m and maximum thickness of 0.2m is given by:
$Y(x)=\pm[0.2969\sqrt{x} -0.126x -0.3516x^2+0.2843x^3 - 0.1015x^4]$
Where plus and minus signs refer to upper and lower surface respectively. Determine x where the thickness of airfoil is 0.1m by using the bisection method . Set tolerance to 0.00001.(There are two solutions).

Good Luck
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