

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

First Semester, 2009-10

AAOC C341: Numerical Analysis

Test – I (Closed Book)

Date: 10th September 2009

Max. Time: 50Mins

Max. Marks: 40

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Note: Start answering each question on a fresh page.
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1. Based on three digits floating point arithmetic with rounding, evaluate $f(x) = 1.01e^{4x} - 4.62e^{3x} + 12.2e^x - 1.99$ at $x = 1.53$ using the process (among left-to-right, right-to-left and nested form) which involves minimum number of operations (with justification). Take $e^{1.53} = 4.62$.
[10]
2. Using secant method, derive Newton's method to find the solution of a non-linear equation $f(x)=0$. Then prove that Newton's method converges quadratically with necessary assumptions.
[4+8]
3. Perform Gauss-Elimination on a matrix

$$A = \begin{pmatrix} 1 & 2.05 & 5 \\ 10 & 1 & -5 \\ 1 & 4 & 2.5 \end{pmatrix}$$

with scaled partial pivoting. Store multipliers, scale factors and pivoting vector. Then, find the second column of A^{-1} (inverse of A) using the forward and backward substitutions. Carry four digits with rounding.
[18]

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