Machine Problems for Numerical Methods
Due: Wednesday 11th week at the Consultation Room

Note: Separate the soft copy of each machine problem in a folder. All machine problems should be executable.

Requirements:
1. Soft copy of the following: (CD or DVD format)
- Executable program files
- Source code and reference.
- Soft copy of the user manual

2. Hard copy: Documentation
- Discussion of the techniques (perforate the discussion from your lecture notes).
- User manual of program with screen shots of program layout.
- Source code and reference (Appendix)

Machine Problem 1:
Coverage:
Bracketing techniques (Select 1 only)
    1. Bisection method
    2. Regula-Falsi method
Note : Applicable to both polynomial and transcendental functions

Machine Problem 2:
Coverage:
Open Methods (select 1 only)
    1. Fixed point iteration (MOSS)
    2. Secant method
    3. Newton's method
    4. Newton-Raphson method
Note: Applicable to both polynomial and transcendental functions

Machine Problem 3:
Coverage:
Polynomial techniques (Select 1 only)
    1. Bairstow's method
    2. Muller's method

Direct methods for system of linear equations (Select 1 only)
Matrix Decomposition Techniques
    1. Crout's / Cholesky's method
    2. Doolittle method

Iterative techniques for system of linear equations (Select 1 only)
1. Gauss-Jacobi method
2. Gauss-Seidel method
3. Relaxation method
4. Successive Under Relaxation (SUR)
5. Successive Over Relaxation (SOR)

Machine Problem 4:
Coverage:
Curve Fitting Techniques (select 1 only)
Regression Techniques
1. Linear Regression
2. Polynomial regression

Interpolation (Select 1 only)
1. Lagrange Interpolating Polynomial
2. Newton's Divided Difference Interpolating Polynomial
Note: Applicable to any number of data points

Numerical Integration (Select 1 only)
1. Trapezoidal Rule
2. Simpson's 1/3 Rule
3. Simpson's 3/8 Rule
4. Boole's Rule
5. Romberg Integration (accompanied by other techniques)
Note: Applicable to any possible number of segments.

Numerical Differentiation (Select 1 only)
1. Forward Finite Divided Difference
2. Backward Finite Divided Difference
3. Centered Finite Divided Difference
4. Romberg Extrapolation (accompanied by other techniques)
Note: Applicable to any step size.