**ICME MATLAB Tutorial**

**Plot the solution of a differential equation:**

Subjected to the following boundary conditions:

Point colocation method:

Subdomain Method:

Least square method:

Galerkin method:

Exact solution:

*Plot domain*

Matlab code:

x = [0 : 0.1: 1];

y = ((-4.75)\*(x.^2)) + (3.5 \* (x.^3));

g = ((-4.4998)\*(x.^2)) + ((3.3332)\*(x.^3));

k = ((-1.8181)\*(x.^2)) + ((0.1738)\*(x.^3));

l = ((1.80)\*(x.^2)) - ((0.861)\*(x.^3));

m = ((2)\*(cos(x))) + ((1.264)\*(sin(x))) + ((x.^2) - (2));

plot(x, y, x, g, x, k, x,l, x , m), legend('Point-Collocation', 'Subdomain' ,'Least square', 'Galerkin', 'Exact' )

title('Solution of the given differential equation')

xlabel('Input value (x)')

ylabel('Output value (u)')