King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

Math 572 , Term: 142 — Assignment (2)
Instructor: Dr. Faisal Fairag — Due Tuesday 10/2/2015

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(1) Let $\Omega = (0,1)$ and $f(x) = x \quad g(x) = \cos(x)$. Verify Cauchy-Schwarz inequality.

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(2) [Problem A.5 Page 240]

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(3) Give vibrational formulation for the problem:

$$-u'' = f \quad \text{with} \quad u'(0) = u'(1) = 0$$

and explain why this problem is not well-posed.

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(4) Modify the Matlab code FEM_1D.m to solve the following problem

$$-u'' + b(x)u' + c(x)u = f(x) \quad \text{with} \quad u(0) = u(1) = 0$$

where $b(x) = -x^3 \quad c(x) = x^2 \quad f(x) = (16\pi^2 + x^2)\sin(4\pi x) - 4\pi x^3 \cos(4\pi x)$

Then approximate the value of u at x = 0.5 and plot the solution.
