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

Math 572 , Term: 142 — Assignment (1)
Instructor: Dr. Faisal Fairag — Due Sundayy 8/2/2015

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(1) [Problem 2.6 Part (b) Page 24]

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(2) [Problem 2.7 Part (a) Page 24]

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(3) Let $\Omega = (0,1)$, show that for any $v \in H_0^1(\Omega)$ we have

$$\|v\|_{L_2(\Omega)} \leq |v|_1$$

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(4) The following matlab lines create a tridiagonal matrix of size nxn.

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n = 5 ;
v = ones(n, 1) ;
A = diag(2 * v, 0) - diag(v(1:n-1), -1) - diag(v(1:n-1), 1)

A =

   2  -1   0   0   0
  -1   2  -1   0   0
   0  -1   2  -1   0
   0   0  -1   2  -1
   0   0   0  -1   2
```

Modify the code to create an nxn tridiagonal matrix

$$T = \begin{bmatrix} 1 & \frac{1}{2} & & & \\ -\frac{1}{2} & \frac{1}{2} & \frac{1}{3} & & \\ & -\frac{1}{3} & \ddots & \ddots & \\ & & \ddots & \frac{1}{n-1} & \frac{1}{n} \\ & & & -\frac{1}{n} & \frac{1}{n} \end{bmatrix}$$