Assignment # 4 MATH471(012) **Dr. AL-Homidan** **Due**: Saturday March 9

1) Page 357, problem # 5.

2) Page 369, problem # 9a.

3) Page 369, problem # 16.

4) Write a Matlab functions for evaluating algorithm 6.1,6.2 and 6.3. Do not use Matlab functions in the CD attached to the book.

5) Use the above Matlab functions to solve the systems

A)

$$1.002x_1 + 58.09x_{25} = 68.12$$
$$5.55x_1 + 321.8x_{25} = 377.3$$

B)

$$x_1 + \tfrac{1}{2}x_2 + \tfrac{1}{3}x_3 + \tfrac{1}{4}x_4 + \tfrac{1}{5}x_5 = 1$$
$$\tfrac{1}{2}x_1 + \tfrac{1}{3}x_2 + \tfrac{1}{4}x_3 + \tfrac{1}{5}x_4 + \tfrac{1}{6}x_5 = 1$$
$$\tfrac{1}{3}x_1 + \tfrac{1}{4}x_2 + \tfrac{1}{5}x_3 + \tfrac{1}{6}x_4 + \tfrac{1}{7}x_5 = 1$$
$$\tfrac{1}{4}x_1 + \tfrac{1}{5}x_2 + \tfrac{1}{6}x_3 + \tfrac{1}{7}x_4 + \tfrac{1}{8}x_5 = 1$$
$$\tfrac{1}{5}x_1 + \tfrac{1}{6}x_2 + \tfrac{1}{7}x_3 + \tfrac{1}{8}x_4 + \tfrac{1}{9}x_5 = 1$$

Using four digits rounding arithmetic. Report the difference between the functions, which one yield accurate results.

6) Let $H = I - 2xx^T$, where $x^T x = 1$. Show that

a) H is symmetric.

b) $H^2 = I$ (involutory).

c) $H^T H = I$ (orthogonal).