‡ Homework #1, ChEg 542

ü **Due 9/3/97**

1. 1.1 in V&M (read as necessary)
2. 1.2 in V&M
3. 1.3 in V&M
4. 1.7 in V&M (note differences in the meaning of "adjoint")
5. Consider the matrix

a = {{7,5,3,4},{1,3,1,4},{13,17,20,2},{3,1,6,9}}

and vector

b = {1,0,9,4}

a. Use Gaussian elimination to solve

a x = b

b. Find Det[A]

c. Find A^{-1} both with and without computing the determinant.

d. Use Gaussian elimination to obtain L and U as

L U x = a x = b

e Find x from a x = L U x = b, that use the L U decomposition to get x.

f. Repeat parts a and e for vector c = {1,1,1,1} instead of b.

g. Now that you have used it, explain why you can calculate x from the L U decomposition of a and why this might be the preferred way for large numerical computations.

6. Use index notation to show that

—·(**u** x **v**) = **v** ·(— x **u**) - **u**·(— x **v**)

— x (**u** x **v**) = **v** ·(— **u**) - **u**·(— **v**) + **u** —· **v** -**v** —· **u**

u x **v** = -**v** x **u**