

## Assignment #8

Due *Wednesday December 3, 2003.*

**Exercise 20.1.**

**Exercise 21.1.**

**Exercise 21.6.**

**Exercise 23.3.**

**Exercise 24.1.**

**Exercise 24.3.**

DO EITHER OF THE FOLLOWING EXERCISES:

**X.** Write an algorithm which takes as input a square  $m \times m$  matrix  $A$  and computes  $PA = LU$  by partial pivoting. However, unlike Algorithm 21.1, your algorithm will not actually move rows in memory, and indeed the computation will be “in place” as described in class for Algorithm 20.1. That is, no more memory will be used to store  $L$  and  $U$  than the memory already used to store  $A$ .

Clearly some memory must be used to store  $P$ . However, your algorithm will use only  $m$  memory locations to store  $P$ , that is,  $P$  will be stored as a permutation vector.

(The solution to exercise **X** is *either* a working MATLAB `m`-file or a clear pseudo-code in the style of the algorithms in the textbook. If it is a working `m`-file then you might test it on the matrix  $A$  given by (21.2) in the text, and compare the result to MATLAB’s `lu` applied to the same matrix.)

OR

**Exercise 21.5.** (*You might read the discussion of complete pivoting in Lecture 21 to get in the right mood.*)