Homework assignment 4, due Tues Nov. 28

Look up course webpage under "Homeworks," specifically for

- New, DETAILED submission guidelines, and late submission policy which you must follow strictly – otherwise you could lose all points;
- how to setup your matlab environment.
- cheating policy and bonus policy under "about homeworks."

Use vectorized matlab operations whenever possible. You lose points whenever a loop is used unnecessarily.

Nonbonus homeworks are generally based on examples discussed in class or assigned in class as specific readings.

1. 6.1.5. Use your code to output the inverses of (the upper triangular part of) the $n \times n$ vandermonde input matrices M, whose elements are $M(i,j) = i^{j-1}$; to get the upper triangular part, take $i = 1:n, j = i:n$; for $n = 1:4$.

2. (i) 6.3.7. You may NOT ignore the possibility of division by zero or small numbers : i.e, you should add in pivoting and permute rows/columns to always divide by the largest number possible. Your routine should be analogous to `GEpiv` and should output U, L and piv, where piv corresponds to a permutation of the *columns* of A.

   (ii) use the UL factorization of A obtained in (i) to solve $Ax = b$. It is important to note that when you manipulate rows, you only need to manipulate the right hand side b accordingly, as when you use `GEpiv`. However, when you manipulate columns, you need to manipulate the solution x accordingly.

   - For both (i) and (ii), print outputs for A being:
     1) the 4 (full) vandermonde matrices as in Problem 1
     2) 2 random input matrices with dimensions 5 and 6 (write a matlab program `randmat`, using `rand` to generate them)
     3) For (ii), use `rand` to create b.

3. 7.2.3 Print outputs for the 6 input matrices described in Problem 2.

4. 7.2.5

5. (20 bonus points, NOT compulsory, NO partial credit) 6.3.10

Throughout, where relevant, you may use the author's mfiles, available at /cise/class/cot4501fa00 in the subdirectories CHAPTER.x