

## Assignments from 1/11 to 1/18

### READING

**Read Sections 1.5, 1.6. Also read pp. 71-72 of Section 1.7.** (You have already read 1.1, 1.2, 1.3; we will pick up some of 1.4 later.)

All problem pages needed from JRA are on the Catalyst Workspace.

### Due Wednesday 10/18: Written Assignment 2

**Reminder 1:** Indicate the TOTAL NUMBER of problems you have done in a BOX at the top of the page.

**Reminder 2:** Staple your papers, or use a paper clip. No folded corners please. They fall apart.

- Section 1.5: #42, 43, 44, 45, 48 (answers must be in vector form!)
- Section 1.5: #66 (Hint: Numerical examples not enough. Use the T given in the problem and define another upper triangular S using some other letters.)
- Section 1.6: #2 (Note that this requires different computations on the left and the right side of the equation. If your answer is as short as the answer to #1 in the back of the book, that is not enough. Show each of the products that must be computed along the way, such as FE.)
- Section 1.6: #3, 4
- Section 1.6: #10, 12 (first compute EF, then (EF)v)
- Section 1.6: #13, 14, 21, 22
- Section 1.6: #26
- Section 1.6: #27 (if this is not true, a numerical counterexample will show it)

### Problem B

Let matrices

$$A = \begin{bmatrix} 1 & 1 & 1 & 2 & -1 \\ 2 & 2 & 3 & 0 & 1 \\ -1 & -1 & 0 & 0 & 2 \end{bmatrix}, \quad E_{12} = \begin{bmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, \quad E_{13} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}, \quad E_{23} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & -1 & 1 \end{bmatrix}.$$

(a) Compute  $E_{12}A$ . Then compute  $E_{13}(E_{12}A)$ . Then compute  $E_{23}(E_{13}(E_{12}A))$ .

(b) Now start with A and row reduce A to echelon form. How are the first couple of steps related to (a)?

(c) Now let  $X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$ . Compute  $E_{12}X$  and  $E_{13}X$  and  $E_{23}X$ . Combine (c) and (a) to

explain what happened in (b). Write a brief explanation or at least an observation or two.