Homework set 5 — M341, Spring 2024

Hand in solutions to the following problems from the book, and to Problem 1 below:

Section 3.1: 1(b,d), 14.
Section 3.2: 1(a,e,f), 13.

Problem 1: Compute the determinants of the following matrices:

$$\mathbf{A} = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 3 & 0 \\ -1 & 0 & 5 \end{bmatrix}$$

$$\mathbf{B} = \begin{bmatrix} 0 & 3 & 0 \\ 1 & 0 & 2 \\ -1 & 0 & 5 \end{bmatrix}$$

$$\mathbf{C} = \begin{bmatrix} 1 & 0 & 0 & -1 \\ 1 & 1 & 0 & -1 \\ 0 & 7 & 3 & 2 \\ 1 & 0 & 2 & 3 \end{bmatrix}$$

$$\mathbf{D} = \begin{bmatrix} 0 & 1 & 0 & 0 & \pi \\ 2 & 0 & 0 & 0 & 1 \\ 0 & 0 & 3 & 0 & 1 \\ 0 & 0 & 0 & 5 & 1 \\ 0 & 0 & -6 & 0 & 1 \end{bmatrix}$$

Use row operations to drive each matrix to upper triangular form, then use the theorem that says that the determinant of a diagonal matrix is the product of its diagonal entries.

Optional problems: There are more "suggested" problems than usual this week since we skipped homework for the exam week. Try to work the "extra" problems from Section 2.4 if you have the time. Do not hand in solutions to any of these problems, however.

Section 2.4: 2, 3c, 4cd, 8, 13, 16, 18, 20.
Section 3.1: 10, 12, 15, 16.
Section 3.2: 2(a,d), 3(a,b), 14, 17.

P.G. Martinsson, UT-Austin, March 2024