

Math 4133 - Linear Algebra

Quiz #6 - 2013.01.30

Solutions

1. Compute the determinant of the following matrix along any row or column. Show ALL work.

$$A = \begin{bmatrix} 0 & 2 & -3 & 2 \\ 5 & 0 & 6 & 0 \\ -2 & 3 & 4 & 1 \\ -4 & 0 & 0 & -1 \end{bmatrix}$$

Answers will vary, but we will expand along the fourth row:

$$\begin{aligned} \det(A) &= (-1)^{4+1} \cdot (-4) \cdot \det \left(\begin{bmatrix} 2 & -3 & 2 \\ 0 & 6 & 0 \\ 3 & 4 & 1 \end{bmatrix} \right) + 0 \cdot \text{stuff} + 0 \cdot \text{stuff} \\ &\quad + (-1)^{4+4} \cdot (-1) \cdot \det \left(\begin{bmatrix} 0 & 2 & -3 \\ 5 & 0 & 6 \\ -2 & 3 & 4 \end{bmatrix} \right) \\ &= 4 \cdot \left(0 \cdot \text{stuff} + (-1)^{2+2} \cdot 6 \cdot \det \left(\begin{bmatrix} 2 & 2 \\ 3 & 1 \end{bmatrix} \right) + 0 \cdot \text{stuff} \right) \\ &\quad + (-1) \cdot \left(0 \cdot \text{stuff} + (-1)^{1+2} \cdot 2 \cdot \det \left(\begin{bmatrix} 5 & 6 \\ -2 & 4 \end{bmatrix} \right) + (-1)^{1+3} \cdot (-3) \cdot \det \left(\begin{bmatrix} 5 & 0 \\ -2 & 3 \end{bmatrix} \right) \right) \\ &= 4 \cdot (6 \cdot (2 - 6)) - 1 \cdot (-2 \cdot (20 + 12) - 3 \cdot (15 - 0)) \\ &= 13 \end{aligned}$$