

Exercises on properties of determinants

Problem 18.1: (5.1 #10. *Introduction to Linear Algebra*: Strang) If the entries in every row of a square matrix A add to zero, solve $A\mathbf{x} = \mathbf{0}$ to prove that $\det A = 0$. If those entries add to one, show that $\det(A - I) = 0$. Does this mean that $\det A = 1$?

Problem 18.2: (5.1 #18.) Use row operations and the properties of the determinant to calculate the three by three “Vandermonde determinant”:

$$\det \begin{bmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{bmatrix} = (b - a)(c - a)(c - b).$$