

Determinants & Elementary Row Operations

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February 17, 2021

- Let \mathbf{A} and \mathbf{B} be square matrices and \mathbf{B} be a matrix resulting from \mathbf{A} by:
 1. interchanging two rows of $\mathbf{A} \Rightarrow \det(\mathbf{B}) = -\det(\mathbf{A})$
 2. Multiplying row of \mathbf{A} by a non-zero constant $\Rightarrow \det(\mathbf{B}) = c \det(\mathbf{A})$, where c is a scalar
 3. Add multiple of row of \mathbf{A} to another row $\Rightarrow \det(\mathbf{B}) = \det(\mathbf{A})$ (no change)
- 4. ex. Given $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = -6$
 - (a) $\begin{vmatrix} d & e & f \\ a & b & c \\ g & h & i \end{vmatrix} = 6$
 - (b) $\begin{vmatrix} 3a & 3b & 3c \\ 2d & 2e & 2f \\ -g & -h & -i \end{vmatrix} = -6(-6) = 36$
 - (c) $\begin{vmatrix} a-d & b-e & c-f \\ 2d & 2e & 2f \\ g & h & i \end{vmatrix} = 2(-6) = -12$