

Determinant of triangular matrices

> Sum the diagonal elements

Let $A_1 = EA$ for elementary matrix E

$$\det(A) = \begin{cases} -\det(A_1) & \text{if two rows or columns have been swapped} \\ \lambda^{-1} \det(A_1) & \text{if a row or column has been multiplied by } \lambda \neq 0 \\ \det(A_1) & \text{if a multiple of a r/c has been added to another r/c} \end{cases}$$

Case row swap

$\det(A) = -\det(A_1)$ if two rows or columns have been swapped

$$\det(A_1^n) = \begin{pmatrix} a_1 & 0 & \dots & 0 \\ 0 & 0 & a_3 & \dots \\ 0 & a_2 & \dots & 0 \\ 0 & 0 & 0 & \dots & a_n \end{pmatrix} = -1$$

$$A = \begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix}$$

$$A_1 = T_{21}^1 A$$

$$\det(A) * \det(T_{21}^1)$$

$$7 * 1$$

$$C = T^1 S^2 A = \det(A) * 2 * 1 = 14$$