

Another Example

Sometimes G-E is more useful than a cofactor expansion, and often we use a mixture of the two methods.

Ex: Consider the same matrix as in the last example:

$$\begin{aligned} |A| &= \underbrace{\begin{vmatrix} 2 & -1 & 0 & 0 \\ 0 & \frac{3}{2} & -1 & 0 \\ 0 & -1 & 2 & -1 \\ 0 & 0 & -1 & 2 \end{vmatrix}}_{\text{row operation on row 2}} = 2 \underbrace{\begin{vmatrix} \frac{3}{2} & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{vmatrix}}_{\text{expansion on column 1}} \\ &= 2 \underbrace{\begin{vmatrix} \frac{3}{2} & -1 & 0 \\ 0 & \frac{4}{3} & -1 \\ 0 & -1 & 2 \end{vmatrix}}_{\text{row operation on row 2}} = 2 \times \frac{3}{2} \underbrace{\begin{vmatrix} \frac{4}{3} & -1 \\ -1 & 2 \end{vmatrix}}_{\text{expansion on column 1}} \end{aligned}$$

and the 2×2 can be computed by formula.