

## Esercizione 16

venerdì 7 gennaio 2022 11:54

### Calcolo det con la place

$$A = \begin{pmatrix} -1 & 2 & 3 \\ -2 & 0 & 1 \\ 1 & 0 & -2 \end{pmatrix} \quad \begin{array}{ccc} + & - & + \\ - & + & - \\ + & - & + \end{array}$$

$$\det A = -1 \det \begin{pmatrix} 0 & 1 \\ 0 & -2 \end{pmatrix} + 2 \det \begin{pmatrix} 2 & 3 \\ 0 & -2 \end{pmatrix} + 1 \det \begin{pmatrix} 2 & 3 \\ 0 & 1 \end{pmatrix} =$$
$$= -4 \cdot 0 + 2(-4) + 1 \cdot 2 = -8 + 2 = -6$$

$$\det A = 2 \det \begin{pmatrix} 2 & 3 \\ 0 & -2 \end{pmatrix} + 0 \det \begin{pmatrix} -1 & 3 \\ 1 & -2 \end{pmatrix} - 1 \det \begin{pmatrix} -1 & 2 \\ 1 & 0 \end{pmatrix} = -6$$

$$\det A = -2 \det \begin{pmatrix} -2 & 1 \\ 1 & -2 \end{pmatrix} + 0 + 0 = -6.$$

### A. G e det

B è ottenuta da A

- op I tipo  $\Rightarrow \det B = -\det A$
- op II tipo  $\Rightarrow \det B = \lambda \det A$
- op III tipo  $\Rightarrow \det B = \det A$

$$\det \begin{pmatrix} 1 & 0 & 2 & 1 \\ 2 & 1 & 1 & 0 \\ 1 & -2 & -1 & 0 \\ -1 & 3 & -2 & 2 \end{pmatrix}$$

Tramite la place

$$(-1) \det \begin{pmatrix} 2 & 1 & 1 \\ 1 & -2 & -1 \\ -1 & 3 & -2 \end{pmatrix} + 2 \det \begin{pmatrix} 1 & 0 & 2 \\ 2 & 1 & 1 \\ 1 & -2 & -1 \end{pmatrix} =$$

$$= (-1) \left[ 2 \det \begin{pmatrix} -2 & -1 \\ 3 & -2 \end{pmatrix} - 1 \det \begin{pmatrix} 1 & 1 \\ 3 & -2 \end{pmatrix} - 1 \det \begin{pmatrix} 1 & 1 \\ -2 & -1 \end{pmatrix} \right] +$$

$$+ 2 \left[ 1 \det \begin{pmatrix} 1 & 2 \\ 1 & -1 \end{pmatrix} + 2 \det \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix} \right] =$$

$$- 1 [ 2 (4+3) - 1 (-2-3) - 1 (-1+2) ] +$$

$$+ 2 [ 1 (-1-2) + 2 (1-4) ] =$$

$$= -1 [ 14 + 5 - 1 ] + 2 [ -3 - 6 ] = -18 - 18 = -36.$$

Tramite Gauss.

$$\begin{pmatrix} 1 & 0 & 2 & 1 \\ 2 & 1 & 1 & 0 \\ 1 & -2 & -1 & 0 \\ -1 & 3 & -2 & 2 \end{pmatrix} \xrightarrow{R_4 \rightarrow R_4 - 2R_1} \det \begin{pmatrix} 1 & 0 & 2 & 1 \\ 2 & 1 & 1 & 0 \\ 1 & -2 & -1 & 0 \\ -3 & 3 & -6 & 0 \end{pmatrix} =$$

$$= -1 \det \begin{pmatrix} 2 & 1 & 1 \\ 1 & -2 & -1 \\ -3 & 3 & -6 \end{pmatrix} = 3 \det \begin{pmatrix} 2 & 1 & 1 \\ 1 & -2 & -1 \\ 1 & -1 & 2 \end{pmatrix} =$$

$$3 \det \begin{pmatrix} 0 & 3 & -3 \\ 0 & -1 & -3 \\ 1 & -1 & 2 \end{pmatrix} = 3 \cdot \det \begin{pmatrix} 3 & -3 \\ -1 & -3 \end{pmatrix} = (-9 - 3) \cdot 3 = -36.$$