

# MATRICI E SISTEMI: soluzioni

Corso di Geometria

1)

$$A \cdot C = \begin{pmatrix} 2 & 0 & -2 \\ -7 & 16 & 7 \\ -7 & 8 & 7 \\ -2 & 10 & 2 \end{pmatrix}.$$

$$B \cdot A = \begin{pmatrix} 2 & 10 & 3 & 1 \\ -2 & 2 & 5 & -7 \\ 1 & 11 & 6 & -2 \end{pmatrix}.$$

$$C \cdot B = \begin{pmatrix} 2 & 9 & 3 & -4 \\ 2 & 8 & 2 & -4 \\ 2 & 10 & 4 & -4 \\ -6 & -27 & -9 & 12 \end{pmatrix}.$$

2)  $\det(A) = -21$ ,  $\det(B) = 0$ ,  $\det(C) = 0$ ,  $\det(D) = -4$ ,  $\det(E) = -4$ ,  $\det(F) = 9$ .

$$A^{-1} = \begin{pmatrix} \frac{8}{21} & -\frac{2}{21} & \frac{1}{21} \\ -\frac{1}{3} & \frac{1}{3} & \frac{1}{3} \\ \frac{5}{21} & \frac{4}{21} & -\frac{2}{21} \end{pmatrix}, \quad D^{-1} = \begin{pmatrix} \frac{1}{2} & 2 & -\frac{1}{2} & -\frac{3}{2} \\ 0 & -1 & 0 & 1 \\ \frac{1}{2} & -1 & -\frac{1}{2} & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 \end{pmatrix},$$

$$E^{-1} = \begin{pmatrix} \frac{1}{2} & -\frac{1}{4} \\ -\frac{1}{2} & -\frac{1}{4} \end{pmatrix}, \quad F^{-1} = \begin{pmatrix} \frac{1}{3} & \frac{1}{3} & 0 \\ 0 & -1 & -\frac{1}{3} \\ 0 & 0 & -\frac{1}{3} \end{pmatrix}$$

3)

a)  $\text{Sol}(S) = \{(\frac{1}{2}, 1, \frac{1}{2}, -\frac{1}{2})\}$ .

b)  $\text{Sol}(S) = \{(-1, -\frac{17}{4}, -2, \frac{9}{4})\}$ .

c)  $\text{Sol}(S) = \{(1 + \frac{1}{2}\alpha, 1 + \frac{3}{2}\alpha, 1, \alpha) \mid \alpha \in \mathbb{R}\}$ .

d)  $\text{Sol}(S) = \emptyset$ .

e)  $\text{Sol}(S) = \{(-\frac{1}{3}\alpha, \alpha, -\beta, \beta) \mid \alpha, \beta \in \mathbb{R}\}$ .