

MATHEMATICS

Tuesday March 2 2017

First exercise class

Second part

- 1) Determine the parametric equation and the Cartesian equation of the plane π passing through $A(1,1,1)$, $B(1,0,-1)$, $C(0,-1,1)$.
Determine the parametric equation and the Cartesian equation of the line r passing through $D(2,1,0)$ and orthogonal to π .
Determine the parametric equation and the Cartesian equation of the plane β parallel to π and passing through $E(1,-1,3)$.

- 2) Given the matrices

$$A = \begin{pmatrix} 1 & 0 & 2 & 0 \\ 0 & -3 & -1 & 0 \\ -2 & -1 & 1 & 3 \\ 0 & 0 & 0 & -1 \end{pmatrix} \quad \text{and} \quad B = \begin{pmatrix} -1 & 1 & 0 & 0 \\ 0 & -3 & -1 & 2 \\ -2 & 0 & 1 & 3 \\ 0 & 2 & 0 & -1 \end{pmatrix}$$

Calculate:

- $A + B$
- $3A$
- $\text{trace}(B)$
- A^T
- $A \cdot B$
- $B \cdot A$

- 3) Determine, if it is possible, the product between the indicated matrices.

- $A = \begin{pmatrix} 0 & 1 \\ 1 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & 1 \\ 0 & -2 \end{pmatrix}$.
- $A = \begin{pmatrix} 0 & 1 & -1 \\ 1 & 0 & -2 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 0 \\ 0 & -2 \\ 1 & -1 \end{pmatrix}$.
- $A = \begin{pmatrix} 0 & 1 \\ 1 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & -1 & 0 \\ 0 & -2 & 1 \end{pmatrix}$.
- $A = \begin{pmatrix} -1 & 1 & 0 \\ 1 & 0 & -3 \\ 0 & 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 0 & -1 \\ -1 & 2 & 0 \\ 0 & 1 & -2 \end{pmatrix}$.
- $A = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 0 & -2 \\ -1 & 2 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & -2 \\ 1 & 0 \\ 0 & -1 \end{pmatrix}$.
- $A = \begin{pmatrix} 1 & -1 \\ -1 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 2 \\ -2 & 0 \\ 1 & -1 \end{pmatrix}$.
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- 4) Given the matrix Digitare l'equazione qui.

$$A = \begin{pmatrix} t & -t \\ 1 & 1-t \end{pmatrix}$$

for which value of t the determinant of A is 0?

- 5) Given the matrix

$$A = \begin{pmatrix} t & 6t & 2 \\ t^2 + 9 & 0 & 6 - t \\ 2 & t^2 & 1 - t \end{pmatrix}$$

for which value of t the matrix A is symmetric?

6) Calculate the determinant of the following matrices.

- $A = \begin{pmatrix} 2 & 1 \\ 1 & -1 \end{pmatrix}$

- $B = \begin{pmatrix} 5 & 3 \\ 0 & 2 \end{pmatrix}$

- $C = \begin{pmatrix} 1 & 1 & -1 \\ -1 & 2 & -3 \\ -1 & 3 & 4 \end{pmatrix}$

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

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

- $F = \begin{pmatrix} 5 & 3 & 1 \\ 0 & -1 & -2 \\ 0 & 0 & 2 \end{pmatrix}$

- $G = \begin{pmatrix} 3 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 5 & 4 \end{pmatrix}$