Facultatea de Automatica si Calculatoare
Sectia: Calculatoare si Tehnologia Informatiei

Algebra si Geometrie

Timp alocat: 20 min | Semestrul I | Nota maxima: 2

Quiz test

1. (a) Ce coordonate are $\boldsymbol{p} = X + 2$ relativ la baza vectoriala

$$\{\boldsymbol{p}_1 = X^2 + 1,\ \boldsymbol{p}_2 = X + 1,\ \boldsymbol{p}_3 = 1\} \subset \mathbb{R}_2[X] \quad ?$$

(0.25 puncte)

(b) Gasiti matrice nenule $\boldsymbol{A}, \boldsymbol{B} \in M_2(\mathbb{R})$ cu proprietatea

$$(\boldsymbol{A} + \boldsymbol{B})^2 = \boldsymbol{A}^2 + \boldsymbol{B}^2$$

(0.25 puncte)

(c) Scrie un exemplu de subspatiu vectorial propriu a lui $\mathbb{R}_1[X]$.

(0.25 puncte)

(d) Identifica $dim\ ker \boldsymbol{A} = \square$. Justifica rezultatul.

$$\boldsymbol{A} = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \end{pmatrix}$$

(0.25 puncte)

2. (a) Completeaza multimea urmatoare pentru a deveni colectie de generatori in $\mathbb{R}^3$

$$\boldsymbol{u} = (1, 1, 1), \quad \boldsymbol{v} = (0, 0, 0), \ \ldots$$

(0.25 puncte)

(b) Matricea de trecere de la baza $B_1 = \{\boldsymbol{u}_1, \boldsymbol{u}_2\}$ la baza $B_2 = \{\boldsymbol{u}_2, \boldsymbol{u}_1\}$

(0.25 puncte)

$$\boldsymbol{M}_{B_1 B_2} = \boxed{}$$

(c) Plecand de la axiomele $(V_2) - (V_8)$, ale spatiului vectorial, aplicate expresiei

$$(1 + 1) \cdot (\boldsymbol{u} + \boldsymbol{v})$$

aratati ca adunarea vectoriala este comutativa.

(0.25 puncte)

(d) Daca $V_1 = span\{\boldsymbol{v}_1 - \boldsymbol{v}_2, \boldsymbol{v}_1 + \boldsymbol{v}_2\}$ si $V_2 = span\{\boldsymbol{v}_3 + 2\boldsymbol{v}_1, \boldsymbol{v}_3 - \boldsymbol{v}_1\}$, unde $\boldsymbol{v}_1, \boldsymbol{v}_2$ si $\boldsymbol{v}_3$ sunt liniar independenti, atunci $dim(V_1 \cap V_2) = \square$. Justificati.

(0.25 puncte)