Quiz 2 for CS2334(01)

November 13, 2017

StudentName : ______________ *StudentNumber* : ______________ *Index* : ___

(1) Mark ◯ if the vector addition and scalar multiplication forms a vector space, otherwise mark $\times$.

( ) **(a)** For $(R^3, \oplus, \odot)$, the set of all triples of real numbers $[x, y, z]$ with the operations

$$[u, v, w] \oplus [x, y, z] = [u + x, v + y, w + z] \quad and \quad \alpha \odot [x, y, z] = [\alpha x, y, z]$$

( ) **(b)** For $(V, \oplus, \odot)$, where $V = \{x \in R | x > 0\}$, $\alpha \in R$,

$$x \oplus y = xy \quad and \quad \alpha \odot x = x^\alpha$$

( ) **(c)** For $(R^2, \oplus, \odot)$, the set of all paris of real numbers $[x, y]$ with the operations

$$[u, v] \oplus [x, y] = [u + x, v + y] \quad and \quad \alpha \odot [x, y] = [2\alpha x, 2\alpha y]$$

( ) **(d)** For $(V, \oplus, \odot)$, where $V = \{a + bx | a, b \in R\}$,

$$(a + bx) \oplus (c + dx) = (a + c) + (b + d)x \quad and \quad \alpha \odot (c + dx) = (\alpha c) + (\alpha d)x$$

( ) **(e)** For $(R^2, \oplus, \odot)$, the set of all paris of real numbers $[x, y]$ with the operations

$$[u, v] \oplus [x, y] = [u + x + 1, v + y + 1] \quad and \quad \alpha \odot [x, y] = [\alpha x, \alpha y]$$

( ) **(f)** For $(V, \oplus, \odot)$, where $V = \{[1, y] | y \in R\}$, the set of all paris of real numbers $[1, y]$ with the operations

$$[1, x] \oplus [1, y] = [1, x + y] \quad and \quad \alpha \odot [1, y] = [1, \alpha y]$$

(2) Mark ◯ if the statement is true, otherwise mark $\times$.

( ) **(g)** If S and T are subspaces of a vector space V, then $S \cup T$ is a subspace of V.

( ) **(h)** If $V = span(\mathbf{v}_1, \mathbf{v}_2, \cdots, \mathbf{v}_n)$, then $\mathbf{v}_1, \mathbf{v}_2, \cdots, \mathbf{v}_n$ are linearly independent.

( ) **(i)** Let $A \in R^{m \times n}$, then the nullspace of A is a subset of R^n.

( ) **(j)** Let $A \in R^{m \times n}$, then the column space of A is a subset of R^m.

Quiz 2 for CS2334(01)

November 8, 2017

StudentName : ____________ *StudentNumber* : ____________ *Index* : __

(1) Mark ◯ if the vector addition and scalar multiplication forms a vector space, otherwise mark $\times$.

($\times$) **(a)** For $(R^3, \oplus, \odot)$, the set of all triples of real numbers $[x, y, z]$ with the operations

$$[u, v, w] \oplus [x, y, z] = [u + x, v + y, w + z] \quad \textit{and} \quad \alpha \odot [x, y, z] = [\alpha x, y, z]$$

(◯) **(b)** For $(V, \oplus, \odot)$, where $V = \{x \in R | x > 0\}$, $\alpha \in R$,

$$x \oplus y = xy \quad \textit{and} \quad \alpha \odot x = x^{\alpha}$$

($\times$) **(c)** For $(R^2, \oplus, \odot)$, the set of all paris of real numbers $[x, y]$ with the operations

$$[u, v] \oplus [x, y] = [u + x, v + y] \quad \textit{and} \quad \alpha \odot [x, y] = [2\alpha x, 2\alpha y]$$

(◯) **(d)** For $(V, \oplus, \odot)$, where $V = \{a + bx | a, b \in R\}$,

$$(a + bx) \oplus (c + dx) = (a + c) + (b + d)x \quad \textit{and} \quad \alpha \odot (c + dx) = (\alpha c) + (\alpha d)x$$

($\times$) **(e)** For $(R^2, \oplus, \odot)$, the set of all paris of real numbers $[x, y]$ with the operations

$$[u, v] \oplus [x, y] = [u + x + 1, v + y + 1] \quad \textit{and} \quad \alpha \odot [x, y] = [\alpha x, \alpha y]$$

(◯) **(f)** For $(V, \oplus, \odot)$, where $V = \{[1, y] | y \in R\}$, the set of all paris of real numbers $[1, y]$ with the operations

$$[1, x] \oplus [1, y] = [1, x + y] \quad \textit{and} \quad \alpha \odot [1, y] = [1, \alpha y]$$

(2) Mark ◯ if the statement is true, otherwise mark $\times$.

($\times$) **(g)** If S and T are subspaces of a vector space V, then $S \cup T$ is a subspace of V.

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