No

Date

Alinkom 4

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1) $F: R^2 \to R^3$ dengan $F((x,y)^T) = (x, y+1)^T$

$F(\bar{u}) = (u_1, u_2+1)^T$

$F(\bar{v}) = (v_1, v_2+1)^T$

$F(\bar{u}+\bar{v}) = (u_1+v_1, u_2+v_2+1)^T$

$F(\bar{u})+F(\bar{v}) = (u_1+v_1, u_2+v_2+2)^T$

$F(\bar{u}+\bar{v}) \neq F(\bar{u})+F(\bar{v})$ maka bukan transformasi liner

2) $F: R^3 \to R^2$ dengan $F((x,y,z)^T) = (x+y+z, z-y-x)^T$

$F(\bar{u}) = (u_1+u_2+u_3, u_3-u_2-u_1)^T$

$F(\bar{v}) = (v_1+v_2+v_3, v_3-v_2-v_1)^T$

$F(\bar{u}+\bar{v}) = ((u_1+v_1)+(u_2+v_2)+(u_3+v_3), (u_3+v_3)-(u_2+v_2)-(u_1+v_1))^T$

$= F(\bar{u}) + F(\bar{v})$ aksioma 1 ✓

$F(k\bar{u}) = ((ku_1+ku_2+ku_3, ku_3-ku_2-ku_1))^T$

$= k \cdot F(\bar{u})$ aksioma 2 ✓

maka terbukti transformasi linier

3) $F: R^2 \to R^3$ dengan $F(\langle x,y \rangle) = \langle x-y, y-x, y \rangle$

$F(\bar{u}) = \langle u_1-u_2, u_2-u_1, u_2 \rangle$

$F(\bar{v}) = \langle v_1-v_2, v_2-v_1, v_2 \rangle$

$F(\bar{u}+\bar{v}) = \langle u_1+v_1-(u_2+v_2), (u_2+v_2)-(u_1+v_1), u_2+v_2 \rangle$

$= F(\bar{u}) + F(\bar{v})$ aksioma 1 ✓

$F(k \cdot \bar{u}) = \langle ku_1-ku_2, ku_2-ku_1, ku_2 \rangle$

$= k \cdot F(\bar{u})$ aksioma 2 ✓

maka terbukti transformasi linier

4) $F: R^2 \to R^2$ dengan $F(x,y)^T) = \langle 5, x+y \rangle$

$F(\bar{u}) = \langle 5, u_1+u_2 \rangle$

$F(\bar{v}) = \langle 5, v_1+v_2 \rangle$

$F(\bar{u}+\bar{v}) = \langle 5, (u_1+v_1)+(u_2+v_2) \rangle$

$F(\bar{u})+F(\bar{v}) = \langle 10, (u_1+u_2)+(v_1+v_2) \rangle$

$F(\bar{u}+\bar{v}) \neq F(\bar{u})+F(\bar{v})$ maka bukan transformasi linier

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5) $F: M_{2\times 2} \to R$ dengan $F(A) = \det(A)$

$A = \begin{pmatrix} a_1 & a_2 \\ a_3 & a_4 \end{pmatrix}$ $F(A) = a_1 a_4 - a_2 a_3$

$B = \begin{pmatrix} b_1 & b_2 \\ b_3 & b_4 \end{pmatrix}$ $F(B) = b_1 b_4 - b_2 b_3$

$F(A)+F(B) = a_1 a_4 + b_1 b_4 - (a_2 a_3 + b_2 b_3)$

$A+B = \begin{pmatrix} a_1+b_1 & a_2+b_2 \\ a_3+b_3 & a_4+b_4 \end{pmatrix}$

$F(A+B) = (a_1+b_1)(a_4+b_4) - (a_3+b_3)(a_2+b_2)$

$F(A+B) \neq F(A) + F(B)$
maka bukan transformasi linier

6) $F: M_{2\times 2} \to M_{2\times 2}$ dengan $F(A) = A + A^T$

$A = \begin{pmatrix} a_1 & a_2 \\ a_3 & a_4 \end{pmatrix}$ $F(A) = \begin{pmatrix} a_1 & a_2 \\ a_3 & a_4 \end{pmatrix} + \begin{pmatrix} a_1 & a_3 \\ a_2 & a_4 \end{pmatrix} = \begin{pmatrix} 2a_1 & a_2+a_3 \\ a_2+a_3 & 2a_4 \end{pmatrix}$

$B = \begin{pmatrix} b_1 & b_2 \\ b_3 & b_4 \end{pmatrix}$ $F(B) = \begin{pmatrix} 2b_1 & b_2+b_3 \\ b_2+b_3 & 2b_4 \end{pmatrix}$

$F(A+B) = \begin{pmatrix} 2(a_1+b_1) & (a_2+b_2)+(a_3+b_3) \\ (a_2+b_2)+(a_3+b_3) & 2(a_4+b_4) \end{pmatrix}$

$= F(A) + F(B)$ aksioma 1 ✓

$F(k \cdot A) = \begin{pmatrix} k \cdot 2a_1 & k(a_2+a_3) \\ k(a_2+a_3) & k \cdot 2a_4 \end{pmatrix}$

$= k \cdot F(A)$ aksioma 2 ✓

maka terbukti transformasi linieri

7) $F: P_3 \to P_2$ dengan $F(a_0 + a_1 x + a_2 x^2 + a_3 x^3) = 5a_0 + a_3 x^2$

$F(b_0 + b_1 x + b_2 x^2 + b_3 x^3) = 5b_0 + b_3 x^2$

$F(a+b) = 5(a_0+b_0) + (a_3+b_3)x^2$

$= F(a) + F(b)$ aksioma 1 ✓

$F(k \cdot a) = k \cdot 5 a_0 + k \cdot a_3 x^2$

$= k \cdot F(a)$ aksioma 2 ✓

maka terbukti transformasi linier

yang bukan = $\{1, 4, 5\}$