MATE 5150: Asignacion #1

Due on Septiembre 5, 2024

Dr. Pedro Vasquez

Alejandro Ouslan

Problem 1

Find the equation of the plane through he following pairs of points in space. $P_1(1,1,1)$, $P_2(5,5,5)$, and $P_3(-6,4,2)$.

$$d$$

Problem 2

Show thaat the midpoint of the line ssegment joining the points (a,b) and (c,d) is $(\frac{a+c}{2}, \frac{b+d}{2})$.

$$d$$

Problem 3

Let $S = \{0,1\}$ and $F = R$. In $\mathcal{F}(\mathcal{S},\mathcal{R})$, show that $f = g$ and $f+g = h$, where $f(t) = 2t+1$, $g(t) = 1+4t-2t^2$, and $h(t) = 5^t + 1$.

$$d$$

Problem 4

Let V denote the set of ordered pairsa of real numbers. If (a_1,a_2) and (b_1,b_2) are elements of V and $c \in R$, define $(a_1,a_2)+(b_1,b_2) = (a_1+b_1, a_2b_2)$ and $c(a_1,a_2) = (ca_1, ca_2)$.

$$d$$

Problem 5

Let $V = \{(a_1,a_2) : a_1,a_2 \in R\}$. For (a_1,a_2) and (b_1,b_2) in V and $c \in R$, defin $(a_1,a_2)+(b_1,b_2) = (a_1+b_1, a_2+b_2)$ and $c(a_1,a_2) = (ca_1, ca_2)$. Is V a vector space over R with these operations? Justify your answer.

$$d$$

Problem 6

Prove that $A + A^t$ is symmetric for any matrix A.

$$d$$

Problem 7

Let W_1, W_3, and W_4 be as in Excersise 8. Describe $W_1 \cap W_3$, $W_1 \cap W_4$, and $W_3 \cap W_4$, and observe that each is a subspace of R^3.

$$d$$

Problem 8

Let $C^n(R)$ denote the set of all real-valued functions defined on the real line that have a continuous nth derivative. Prove that $C^n(R)$ is a subspace of $\mathcal{F}(R, R)$.

$$d$$