CAAM 336 · DIFFERENTIAL EQUATIONS

Homework 10

Posted Friday 31 January 2014. Due 1pm Friday 7 February 2014.

10. [25 points]

(a) Demonstrate whether or not the set $S_1 = \left\{\mathbf{x} \in \mathbb{R}^2 : \ x_2 = x_1^3\right\}$ is a subspace of $\mathbb{R}^2$.

(b) Demonstrate whether or not the set $S_2 = \left\{\mathbf{x} \in \mathbb{R}^3 : \ 3x_1 + 2x_2 + x_3 = 0\right\}$ is a subspace of $\mathbb{R}^3$.

(c) Demonstrate whether or not the set $S_3 = \{f \in C[0,1] : \ f(x) \geq 0 \text{ for all } x \in [0,1]\}$ is a subspace of $C[0,1]$.

(d) Demonstrate whether or not the set $S_4 = \left\{f \in C[0,1] : \ \max_{x\in[0,1]} f(x) \leq 1\right\}$ is a subspace of $C[0,1]$.

(e) Demonstrate whether or not the set $S_5 = \left\{f \in C^2[0,1] : \ f(1) = 1\right\}$ is a subspace of $C^2[0,1]$.

(f) Demonstrate whether or not the set $S_6 = \left\{f \in C^2[0,1] : \ f(1) = 0\right\}$ is a subspace of $C^2[0,1]$.