Assignment 8

Vishal Ashok

***Abstract*—This document uses the concepts of singular value decomposition in solving a problem.**

https://github.com/vishalashok98/AI5006

Download latex-tikz codes from

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1 Problem

Let V be the(real) vector space of all functions f from R into R. Weather the set containing all functions which are continuous is subspace of V

2 Explanation

If V is a vector Space over field F. A subspace of V is a subset W of V which is itself a vector space over F with the operations of vector addition and scalar multiplication on V

3 Solution

Let f and g be any continuous functions from $R \to R$

and let c be any scalar $\in R$

From real analysis we know that sum and product of continuous functions is continuous. So $cf + g$ is also a continuous function.

Proof: f and g are continuous at a, condition for continuity will be satisfied

$$\lim_{x \to a} f(x) = k_1 \tag{3.0.1}$$

$$\lim_{x \to a} g(x) = k_2 \tag{3.0.2}$$

Applying limits to $cf + g$

$$\lim_{x \to a} cf(x) + g(x) = \lim_{x \to a} g(x) + \lim_{x \to a} f(x) = k_1 + k_2 \tag{3.0.3}$$

So $cf + g$ is also continuous at a

We know from theorem that any non-empty subset W of V is a subspace of V if and only if for each pair of vectors α, β in W and each scalar c in F the vector $c\alpha + \beta$ is again in W.

So given vector space is a subspace.