Matrix theory Assignment 11

Shivangi Parashar

***Abstract*—This document contains the concept of sub space.**

Download all python codes from

https://github.com/shivangi−975/EE5609−Matrix_Theory/tree/master/Assignment11/Codes

Download latex-tikz codes from

https://github.com/shivangi−975/EE5609−Matrix_Theory/blob/master/Assignment11/Assignment_11.tex

1 Problem

Which of the following set of vectors

$$\alpha = (a_1, a_2.....a_n)$$

in $\mathbf{R^n}$ are subspace of $\mathbf{R^n}$ $(n \geq 3)$?
a)All α such that $a_1 \geq 0$
b)All α such that $a_1 + 3a_2 = a_3$
c)All α such that$a_2 = a_1^2$
d)All α such that $a_1 a_2 = 0$
e)All α such that a_2 is rational

2 Solution

Table 0 lists the summary of which set of vectors in $\mathbf{R}^n$ are subspace of $\mathbf{R}^n$ $(n \geq 3)$.

$\alpha = (a_1, a_2 \ldots\ldots\ldots a_n)$	
Vector space	**Subspace summary**
$\alpha = (a_1, a_2, a_3, a_4 \ldots\ldots\ldots, a_n)$; $a_1 \geq 0$	Not a subspace. Scalar multiplication is not satisfied. $-1(\alpha) \neq \alpha$
$\alpha = (a_1, a_2, a_3, a_4 \ldots\ldots\ldots, a_n)$; $a_1 + 3a_2 = a_3$	It is a subspace
$\alpha = (a_1, a_2, a_3, a_4 \ldots\ldots\ldots, a_n)$; $a_2 = a_1^2$	Not a subspace. Addition is not satisfied. $(a_1 + b_1)^2 \neq a_1^2 + b_1^2$
$\alpha = (a_1, a_2, a_3, a_4 \ldots\ldots\ldots, a_n)$; $a_1 a_2 = 0$	Not a subspace. Addition is not satisfied. $a_1 b_1 \neq 0$
$\alpha = (a_1, a_2, a_3, a_4 \ldots\ldots\ldots, a_n)$; a_2 is rational	Not a subspace. Scalar multiplication is not satisfied. $a_2 \neq \sqrt{2} a_1$

TABLE 0: Summary