# Assignment 9

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***Abstract*—This document proves that if two vectors are linearly dependent, one of them is a scalar multiple of the other.**

Download latex-tikz codes from

https://github.com/priya6971/matrix_theory_EE5609/tree/master/Assignment9

## 1 Problem

Prove that if two vectors are linearly dependent, one of them is a scalar multiple of the other.

## 2 Solution

Assume $v$ and $w$ are the two vectors which belongs to $V$ and $F$ be field.

If $v$ and $w$ are linearly dependent, then there exists $a_1$ and $a_2$ which belongs to field $F$ such that

$$a_1 v + a_2 w = 0; a_1 \neq 0 \tag{2.0.1}$$

Now solve the (2.0.1) to get the value of vector $v$;

$$v = -\frac{a_2 w}{a_1} \tag{2.0.2}$$

$$v = cw \tag{2.0.3}$$

$$\implies c = -\frac{a_2}{a_1} \tag{2.0.4}$$

Thus, (2.0.3) indicates that if two vectors $v$ and $w$ are linearly dependent, one of them $v$ is a scalar multiple of the other $w$.