Matrix theory Assignment 16

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***Abstract*—This document contains the concept of algebra of ploynomials.**

Download all python codes from

https://github.com/shivangi−975/EE5609−Matrix_Theory/tree/master/Assignment16/Codes

Download latex-tikz codes from

https://github.com/shivangi−975/EE5609−Matrix_Theory/blob/master/Assignment16/Assignment_16.tex

1 Problem

If f and g are independent polynomials over a field **F**and h is a non-zero polynomial over **F**, show that fh and gh are independent.

2 Solution

Given f and g are independent polynomials over a field **F**. Consider scalars a and b $\in$ **F** Hence,

$$af + bg = 0 \tag{2.0.1}$$

Since f and g are independent Hence f and g $\neq 0$

$$\implies a, b = 0. \tag{2.0.2}$$

Given h a non zero polynomial over **F**. Substituting in equation (2.0.1) we have,

$$a(fh) + b(gh) = 0 \tag{2.0.3}$$
$$(af)h + (bg)h = 0 \tag{2.0.4}$$
$$(af + bg)h = 0 \tag{2.0.5}$$
$$af + bg = 0 \tag{2.0.6}$$

f and g are independent polynomial.Also from equation (2.0.2) a=0 and b=0.
Hence proved fh and gh are independent.