Matrix theory Assignment 16

Shivangi Parashar

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 \mathbf{F} . Consider scalars a and $\mathbf{b} \in \mathbf{F}$ Hence,

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

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,

$$a(fh) + b(gh) = 0$$
 (2.0.3)

$$(af)h + (bg)h = 0$$
 (2.0.4)

$$(af + bg)h = 0$$
 (2.0.5)

$$af + bg = 0$$
 (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.

1