Assignment 16

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***Abstract*—This is a simple document explaining how to determine whether a set of polynomials are linearly independent or not.**

Download all and latex-tikz codes from

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svn co https://github.com/gadepall/school/trunk/
    ncert/geometry/figs
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1 Problem

Let $\mathbf{S}$ be a set of non-zero polynomials over a field F. If no two elements of $\mathbf{S}$ have the same degree, show that $\mathbf{S}$ is an independent set in $\mathbf{F}[\mathbf{x}]$.

2 Solution

Given	$\mathbf{S}$ be a set of non-zero polynomial over a field F No two elements of $\mathbf{S}$ have the same degree
To prove	$\mathbf{S}$ is an independent set in $\mathbf{F}[\mathbf{x}]$
Properties of Trace of Matrix	1.$tr(\mathbf{M}+\mathbf{N}) = tr(\mathbf{M}) + tr(\mathbf{N})$ 2. $tr(c\mathbf{M}) = c(tr(\mathbf{M}))$ Where $\mathbf{M}$ and $\mathbf{N}$ are two square matrices
Proof	As $f_B(\mathbf{A}) = tr(\mathbf{B}^t\mathbf{A})$ $\implies f_B(c\mathbf{A_1}+\mathbf{A_2})$ $= tr(\mathbf{B}^t(c\mathbf{A_1}+\mathbf{A_2}))$ $\implies f_B(c\mathbf{A_1}+\mathbf{A_2}) = tr(c\mathbf{B}^t\mathbf{A_1})$ $+tr(\mathbf{B}^t\mathbf{A_2})$ $\implies f_B(c\mathbf{A_1}+\mathbf{A_2}) = c(tr(\mathbf{B}^t\mathbf{A_1}))$ $+tr(\mathbf{B}^t\mathbf{A_2})$ $\implies f_B(c\mathbf{A_1}+\mathbf{A_2})$ $= cf_B(\mathbf{A_1}) + f_B(\mathbf{A_2})$

Hence, it can be said that f_B is a linear functional on V.