Matrix theory - Assignment 20

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***Abstract*—This document deals with ideals of polynomial.**

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https://github.com/satyam463/Assignment−20/blob/main/Assignment%2020.tex

1 Problem Statement

Let F be a field , show that the intersection of any numbers of ideals in F[x] is an ideal.

2 Pictorial representation

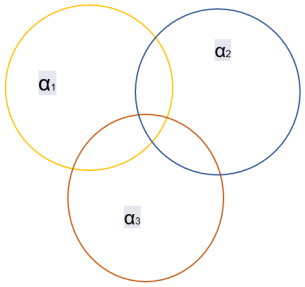

Fig. 0: Index set containing α

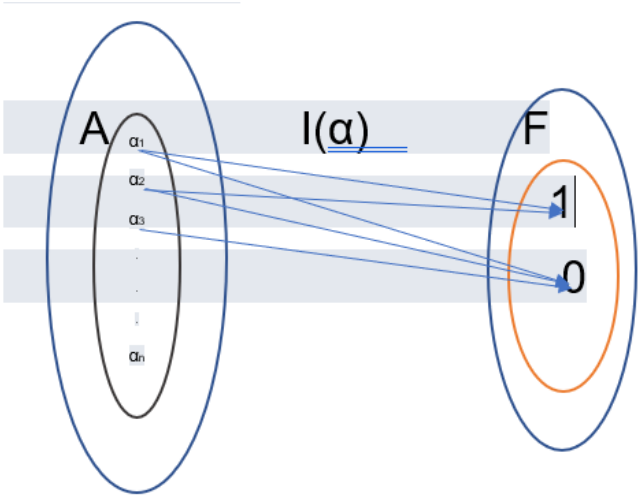

Fig. 0: ideal containing I_α

3 Solution

Given	F is a field
To prove	I=$\bigcap_{\alpha\in A} I_\alpha$ is an ideal
Proof	Let A be an index set and I_α be an in F[x] for each $\alpha \in$ A Obviously I is the subspace since I_α is a subspace of F[x] and arbitrary intersection of subspace is also a subspace. Let g(x) $\in$ F[x] and f(x) $\in$ I Since f(x) $\in$ I and I_α is an ideal follows that f(x) g(x) $\in I_\alpha$ $\forall \alpha \in A$ Thus f(x) g(x) $\in$ I.