Algebraic Geometry Notes

Ch.12: Culminating Topics (week 12)

Your Name

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Contents

1 Introduction

1.1 Overview

These notes cover material from the Algebraic Geometry course at University of Melbourne.

1.2 Prerequisites

- Linear Algebra
- Abstract Algebra (Groups, Rings, Fields)
- Basic Topology

2 Basic Definitions

Definition 1 (Affine Variety)**.** An affine variety is the set of common zeros of a collection of polynomials in $\mathbb{A}^n$.

Example 1. The unit circle in $\mathbb{A}^2$ is given by $V(x^2 + y^2 - 1)$.

3 Theorems and Proofs

Theorem 1 (Nullstellensatz)**.** *Let $I \subset k[x_1, \ldots, x_n]$ be an ideal. Then $I(V(I)) = \sqrt{I}$.*

Proof. The proof follows from the correspondence between ideals and algebraic sets. □

4 Examples

Example 2. Example illustrating the concept with detailed explanation.

5 Exercises

Exercise 1. Exercise statement here.

6 References

- Hartshorne, R. *Algebraic Geometry*
- Shafarevich, I.R. *Basic Algebraic Geometry*