

# Commutative Algebra

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## **Part I**

# **Affine algebraic geometry**

# Chapter 1

## Nullstellensatz

1.1 (Weak nullstellensatz).

1.2 (Noether normalization theorem).

### 1.1 Graded rings

## Chapter 2

# Primary decomposition

### 2.1 Primary ideals

### 2.2 Uniqueness theorems

### 2.3 Gröbner basis

2.1 (Buchberger's algorithm).

### Exercises

primary vs prime powers primary vs prime radical

# Chapter 3

## Localization

local ring DVR extension of ideals

## **Part II**

# **Dimension theory**

# Chapter 4

4.1 (Krull's Hauptidealsatz).