Computer Algebra

Lecture Notes
Johannes Kepler Universität Linz
Wintersemester 2010/11

Prof. Franz Winkler
Institut für Symbolisches Rechnen
(RISC)

© Copyright by F. Winkler

Contents

1. What is Computer Algebra ? 1

2. Gröbner Bases 5

2.1. Introduction 5

2.2. Gröbner bases at Work 9

2.3. The notion of a Gröbner basis 13

2.4. Solving ideal problems by Gröbner bases 27

3. Greatest common divisors of polynomials 43

3.1 Gröbner bases and GCDs 43

3.2 A modular GCD algorithm 49

3.3 Squarefree factorization 55

4. Resultants 57

References 63

The material in these lecture notes is largely taken from

> F. Winkler, "Polynomial Algorithms in Computer Algebra", Springer-Verlag Wien New York (1996)

where also proofs of the theorems can be found.