

Part Two:

Polynomials and Rational Expressions

Computer algebra packages are essentially “equation crunchers” (in analogy with, or contrast to, the number crunching algorithms of numerical analysis). Therefore it is worthwhile to look into the internal data representations and basic expression manipulation facilities in Maple.

One major problem in symbolic computation is to decide whether two expressions are mathematically equivalent. Symbolically, we define canonical and normal forms to represent expressions. Numerically, we compare the values of the expressions evaluated at sufficiently many random points.

Five lectures are devoted to polynomials and rational expressions:

10. Univariate and multivariate polynomials
11. Rational functions and conversions
12. Representation of polynomials and rational expressions
13. Substitution, expansion and factorization
14. Canonical and normal form; collecting and sorting