

## Part Four:

# Advanced Maple

We start this last part by looking into the composite data structures of Maple. Then we discuss the ability to work with assumptions and investigate how simplifications are performed. Plotting is one of the main strengths of Maple, we will spend two lectures on plots, in two and three dimensions. The last three lectures in this part are devoted to solving polynomial, differential, and linear equations.

The titles of the eight lectures are

21. Sequence, Set, and List
22. Array, Table, and Conversions
23. The assume facility and Simplification
24. Two-Dimensional Plots
25. Three-Dimensional Plots
26. Solving Equations
27. Differential Equations
28. Linear Algebra

In this part we look into the more advanced features of Maple [7], considering what is essential to every scientific programmer [4] while doing experimental mathematics [8]. We cover [5, Chapters 12-18].

There is a wide variety of interesting books on “solving mathematical problems using Maple”, see for instance [6] for plotting curves and surfaces, [1] for ordinary differential equations and [3] for partial differential equations. Linear algebra with Maple is treated in [2].

## References

- [1] M.L. Abel and J.P. Braselton. *Differential Equations with Maple V*. Academic Press, second edition, 2000.
- [2] W.C. Bauldry, B. Evans, and J. Johnson. *Linear Algebra with Maple*. John Wiley, 1995.
- [3] D. Betounes. *Partial Differential Equations for Computational Science: with Maple and Vector Analysis*. Springer-Verlag, 1998.
- [4] R.M. Corless. *Essential Maple 7. An introduction for Scientific Programmers*. Springer-Verlag, 2002.
- [5] A. Heck. *Introduction to Maple*. Springer-Verlag, third edition, 2003.
- [6] G. Klimek and M. Klimek. *Discovering Curves and Surfaces with Maple*. Springer-Verlag, 1997.
- [7] M.B. Monagan, K.O. Geddes, K.M. Heal, G. Labahn, S.M. Vorkoetter, J. McCarron, and P. DeMarco. *Maple 9 Advanced Programming Guide*. Maplesoft, 2003.
- [8] F. Vivaldi. *Experimental Mathematics with Maple*. Chapman & Hall/CRC Mathematics, 2001.