
Contents

Acknowledgements	<i>page viii</i>
1 Introduction	1
1.1 Why This Book?	2
1.2 The Maple Interface	3
1.3 How to Read This Book	4
2 Getting Started	6
2.1 Configuring the Interface	6
2.2 The Help System	9
2.3 Statements and Execution	10
2.4 Spaces, Line Breaks and Comments	16
2.5 Execution Groups	18
2.6 Sections	19
2.7 Displayed Results and Return Values	19
2.8 Obtaining Approximate Results	21
2.9 Elementary Functions	24
2.10 Complex Numbers	27
2.11 Variables	31
2.12 Names	34
2.13 Automatic Simplification and Evaluation	37
2.14 Concatenation	42
2.15 Relational Operators	44
2.16 Sequences	48
2.17 Sets and Lists	49
2.18 Indices	53
2.19 Element-wise Operations	56
2.20 The seq, add and mul Commands	58
2.21 Types	62

vi	<i>Contents</i>	
	2.22 Packages	65
3	Algebra and Calculus	71
	3.1 Manipulating Expressions	71
	3.2 Extracting Parts of an Expression	76
	3.3 Substitutions	79
	3.4 Functions	81
	3.5 Limits	87
	3.6 Summing Series	89
	3.7 Differentiation	92
	3.8 Integration	94
	3.9 Series Expansions	97
	3.10 Assumptions	99
4	Solving Equations	103
	4.1 Solving Single Equations	103
	4.2 Solving Multiple Equations	107
	4.3 Solving Approximately	109
	4.4 Differential Equations	113
5	Linear Algebra	117
	5.1 Creating Matrices and Vectors	117
	5.2 Accessing Vector and Matrix Entries	120
	5.3 Displaying Matrices and Vectors	122
	5.4 Addition, Multiplication and Scalar Products	123
	5.5 Vector Products and Norms	125
	5.6 Other Matrix Operations	127
	5.7 Solving Linear Systems	129
	5.8 Copying Matrices and Vectors and Testing for Equality	129
6	Graphics	133
	6.1 Creating Basic Plots	133
	6.2 Customising a Plot	135
	6.3 Parametric and Polar Plots	137
	6.4 Three-Dimensional Plots	138
	6.5 Combining Plots	140
	6.6 Plots from Data	141

<i>Contents</i>		vii
	6.7 Animations	144
7	Programming	147
	7.1 Conditional Statements	147
	7.2 Do Loops	150
	7.3 Nesting and printlevel	158
	7.4 The print and printf Commands	159
	7.5 Arrays	162
	7.6 Tables	168
8	Procedures	174
	8.1 A Basic Procedure	174
	8.2 The Structure of a Procedure	176
	8.3 Local and Global Variables	178
	8.4 Arguments and Parameters	183
	8.5 Checking Argument Validity	189
	8.6 Data Returned by Procedures	191
	8.7 Returning Unevaluated	192
	8.8 Output Displayed from Within Procedures	195
	8.9 Remember Tables and Recursion	195
	8.10 Viewing a Procedure Definition	197
9	Example Programs	200
	9.1 Pascal's Triangle	200
	9.2 The Collatz Problem	203
	9.3 A Newton–Raphson Iteration	205
	9.4 Sorting Data	208
	9.5 Quadrature Formulae	211
	9.6 Necklaces	215
<i>Appendix A</i>	Other Ways to Run Maple	219
<i>Appendix B</i>	Terminating Characters	223
	<i>Index of Maple Notation</i>	225