

Fredrik Gustafsson and Niclas Bergman



MATLAB[®] for Engineers *Explained*



Springer

CONTENTS

1	Learning MATLAB	1
1	Introduction	1
2	Interactive computation and elementary functions	6
3	Manipulating matrices	9
4	Strings and workspace administration	16
5	Graphical illustrations	22
6	Matrix algebra and polynomials	28
7	Advanced graphics	33
8	MATLAB Scripts	36
9	MATLAB Functions	41
10	Functions of functions	57
2	Advanced Programming	61
11	Data Structures	61
11.1	Sparse Matrices	61
11.2	Multidimensional Arrays and Cell Arrays	64
11.3	Structs	67
12	Object Orientation	72
13	Graphical Object Orientation and User Interfaces	76
13.1	Graphical objects	76
13.2	Default settings	77
13.3	Graphical User Interface (GUI)	78
13.4	Constructing a GUI using guide	83
14	Optimizing MATLAB Code	84
15	Calling C-routines from MATLAB	88

3 Applications of MATLAB	91
16 Calculus	91
17 Data interpolation	96
18 Linear Algebra	100
19 Optimization	115
20 Numerical Accuracy and Number Representation	123
21 Statistics	127
22 Control Theory and the LTI Object	132
23 Dynamical Simulation with SIMULINK	138
24 Ordinary Differential Equations	143
25 Signal processing	146
26 Communication systems	162
27 Documentation, presentation and animation	167
 A Answers to the exercises	 171
 B Command reference	 179
 C Summary of mathematical functions	 185
 D Toolbox Summaries	 193
 E Graphics summary	 201