

# Matlab and Image Processing with MATLAB

## 1 Beginnings (Jan. 21/28; Feb. 4/11))

General references:

MATLAB Primer (Sixth Edition)  
Kermit Sigmon/Timothy A. Davis  
Chapman & Hall/CRC, 2002

Mastering MATLAB7  
(A Comprehensive Tutorial and Reference)  
Duane Hanselman/Bruce Littlefield  
Pearson/Prentice Hall, 2005

Matlab Guide  
Desmond J. Higham/Nicholas J. Higham  
SIAM, 2000

Graphics and GUIs with MATLAB (Third Edition)  
Patrick Marchand/O. Thomas Holland  
Chapman & Hall/CRC, 2003

Training from the Mathworks:  
MATLAB Fundamentals and Programming Techniques

Matlab Programming for Engineers (2nd Edition)  
Stephen J. Chapman  
Brooks/Cole, 2002

Scientific Computing with MATLAB  
Alfio Quarteroni/Fausto Saleri  
Springer, 2003

MATLAB for Engineers Explained  
Fredrik Gustafsson/Niclas Bergman  
Springer, 2003

Essential MATLAB for Scientists and Engineers  
(2nd Edition)  
Brian D. Hahn  
Elsevier, 2003

Introduction to Matlab7 for Engineers  
William J. Palm III  
McGraw-Hill, 2005

All the pdf files indicated below are available at  
[http://cda.psych.uiuc.edu/matlab\\_pdf](http://cda.psych.uiuc.edu/matlab_pdf)

(a) Getting Started (getstart.pdf; handed out as hard copy in class)

1) Introduction

2) Matrices and Arrays

6) Desktoptools and Development Environment

Webinar: Introduction to MATLAB 7 (Live broadcast was Jan. 13, 2005)

Matlab pdfs:

matlab\_env.pdf (desktoptools and development environment)

math.pdf

refbook.pdf

refbook2.pdf

refbook3.pdf

(b) Programming

4) Getting Started: Programming

Matlab pdfs:

matlab\_prog.pdf

programming\_tips.pdf

apiext.pdf

apiref.pdf

(c) Graphics

3) Getting Started: Graphics

Matlab pdf:

graphg.pdf

(d) Guis

5) Getting Started: Creating Graphical User Interfaces

Matlab pdf:

buildgui.pdf

## 2 Statistics/Curve Fitting (Feb. 18/25; March 4)

References:

Computational Statistics Handbook with MATLAB  
Wendy L. Martinez/Angel R. Martinez  
Chapman & Hall/CRC, 2002

Exploratory Data Analysis with MATLAB  
Wendy L. Martinez/Angel R. Martinez  
Chapman & Hall/CRC  
2005

Training from the Mathworks:  
Statistical Methods in MATLAB

(a) Webinar: Data Analysis with Curve Fitting and Statistics  
Toolboxes

Matlab pdfs:

stats.pdf (Matlab Statistics Toolbox Manual)  
curvefit.pdf (Matlab Curve-Fitting Toolbox Manual)

(b) Webinar: Biomedical Statistics and Curve Fitting with  
MATLAB; New Statistics Tools in MATLAB and the Statistics  
Toolbox

(c) Webinar: MATLAB for Bioinformatics

Matlab pdfs:

bioinfo\_ug.pdf  
gads\_tb.pdf (genetic algorithm)

### 3 Optimization (March 11/18)

References:

Applied Optimization with MATLAB Programming  
P. Venkataraman  
Wiley, 2002

Training from the Mathworks:  
MATLAB Based Optimization Techniques

(a) Webinar: Applied Optimization Using Matlab  
Matlab pdf:

optim\_tb.pdf (Matlab Optimization Toolbox Manual)

(b) Case study in changing a Fortran Subroutine to Matlab:  
The Dykstra-Karzmarz Fortran routine to MATLAB — (linear inequality constrained least-squares)

Case study in producing and calling Fortran dlls with MATLAB:

Fitting/Finding a unidimensional scaling for a proximity matrix

(c) Webinar: Genetic Algorithms and New Optimization Methods in MATLAB

## 4 Image Processing (April 1/8/15)

### References:

Introduction to Digital Image Processing with MATLAB  
Alasdair McAndrew  
Thomson, 2004

Digital Image Processing Using Matlab  
Rafael C. Gonzalez/Richard E. Woods/Steven L. Eddins  
Pearson/Prentice Hall, 2004

Training from the Mathworks:  
MATLAB for Image Processing

(a) Webinar: Image Processing Using MATLAB

Matlab pdf:

images\_tb.pdf (Matlab Image Processing Toolbox Manual)

(b) Webinar: Biomedical Image Processing with MATLAB

(c) Webinar: Geospatial Data Analysis Using MATLAB

Matlab pdf:

map\_ug.pdf (Matlab Mapping Toolbox Manual)

## 5 Other Things (April 22/29)

(a) fMRI-type Packages

SPM2

Lyngby

Brainstorm

EMEGS

(b) Various Related Toolboxes:

Neural Net (nnet.pdf)

Wavelet (wavelet\_ug.pdf)

Spline (splines.pdf)

Virtual Reality (vr.pdf)

Symbolic (symbolic\_tb.pdf)