

Table of Contents

What is Mathcad?

Mathcad features

How to use this User's Guide

1: The Basics

First principles

What you can do with Mathcad

Working with windows

A simple calculation

Definitions and variables

Entering text

Regions and menus

Iterative calculations

Graphs

Saving, printing, and quitting

2: On-line Resources

Internet access in Mathcad

The Collaboratory

Resource Center

Using Electronic Books

Help and context sensitive help

3: Editing Equations

Building expressions

Editing an existing expression

Rearranging your worksheet

4: Worksheet Management

Worksheets and templates

Layout

Printing

Mailing

Safeguarding your calculations

References and hyperlinks

Using OLE

5: Text

Inserting text

Equations in text

- Text editing
- Text styles
- Text region properties
- Find and Replace
- Spell-checking

6: Equation and Result Formatting

- Formatting results
- Math styles
- Highlighting equations

7: Equations and Computation

- Defining variables and functions
- Evaluating expressions
- Copying numerical results
- Controlling calculations
- Disabling equations
- Error messages

8: Variables and Constants

- Names
- Predefined variables
- Numbers
- Complex numbers
- Strings

9: Units and Dimensions

- Computing with units
- Displaying units of results
- Built-in units
- Changing dimension names

10: Vectors and Matrices

- Creating a vector or matrix
- Computing with arrays
- Subscripts and superscripts
- Displaying vectors and matrices
- Limits on array sizes
- Vector and matrix operators
- Vector and matrix functions
- Doing calculations in parallel
- Simultaneous definitions
- Arrays and user-defined functions

Nested arrays

11:Range Variables

Range variables

Output tables

Entering a table of numbers

Iterative calculations

Seeded iteration

Vector or subscript notation

12:Operators

List of operators

Summations and products

Derivatives

Integrals

Boolean operators

Customizing operators

13:Built-in Functions

Inserting built-in functions

Transcendental functions

Truncation and round-off functions

Discrete transform functions

Sorting functions

Piecewise continuous functions

String functions

14:Statistical Functions

Population and sample statistics

Probability distributions

Histogram function

Random numbers

Interpolation and prediction functions

Regression functions

Smoothing functions

15:Solving Equations

Solving one equation

Systems of equations

Using the solver effectively

16:Solving Differential Equations

Solving ordinary differential equations

Systems of differential equations
Specialized differential equation solvers
Boundary value problems

17:Symbolic Calculation

What is symbolic math?
Live symbolic evaluation
Using the Symbolics menu
Symbolic algebra
Symbolic calculus
Solving equations symbolically
Symbolic matrix manipulation
Symbolic transforms
Symbolic optimization
Using functions and variables
Limits to symbolic processing

18:Programming

Defining a program
Conditional statements
Looping
Controlling program execution
Error handling
Programs within programs
Evaluating programs symbolically
Programming examples

19:Data Management

Introduction to components
Importing data
Exporting data
Exchanging data with other applications
Functions for reading and writing ASCII data files

20:Graphs

Creating a graph
Graphing functions
Graphing a vector
Graphing more than one expression
Formatting the axes
Formatting individual curves
Setting default formats

Labeling your graph
Modifying your graph's perspective
Gallery of graphs

21:Polar Plots

Creating a polar plot
Graphing more than one expression
Formatting the axes
Formatting individual curves
Setting default formats
Labeling your polar plot
Modifying your polar plot's perspective
Gallery of polar plots

22:Surface Plots

Creating a surface plot
Resizing surface plots
Formatting surface plots

23:Contour Plots

Creating a contour plot
Resizing a contour plot
Formatting contour plots

24:3D Bar Charts

Creating a 3D bar chart
Resizing 3D bar charts
Formatting 3D bar charts

25:3D Scatter Plots

Creating a 3D scatter plot
Resizing scatter plots
Formatting scatter plots

26:Vector Field Plots

Creating a vector field plot
Resizing vector field plots
Formatting vector field plots

27:Animation

Creating an animation clip
Playing an animation clip
Gallery of animations

28:Importing and Exporting Graphics

- Reading and writing graphics files

- Creating pictures

- Formatting pictures

A: Reference

- Menu commands

- Function keys

- Greek letters

- Operators

- Built-in functions listed alphabetically

- Predefined variables

- Suffixes for numbers

- Arrow and movement keys

B: Unit Tables

- SI units

- CGS units

- U.S. customary units

- MKS units

- Alphabetical list of units

C: Creating a User DLL

- Creating dynamically linked libraries

- A sample DLL

- Examining a sample DLL

- Handling arrays

- Allocating memory

- Exception handling

- Structure and function definitions

Index
