Lab 1

MathCAD

Purpose

To become familiar with MathCAD 5.0.

1.1 MathCAD

MathCAD is a powerful software program that basically turns your computer into a supercalculator, and the video screen into a large scratch pad. The software is capable of doing high precision arithmetic, complicated graphs, derivatives, integrals, fast Fourier transforms, symbolic manipulations, and many other mathematical feats. To become familiar with MathCAD you should carefully study the built-in tutorial. At the end of this tutorial you are expected to know how to:

- Evaluate arithmetic expressions.
- Edit an equation.
- Define a variable.
- Assign a range to a variable.
- Create a graph region and plot a graph.
- Use the built-in mathematical functions.
- Evoke the MathCAD operators.

To enter MathCAD and the tutorial, follow the steps given below.

1.2 Getting Started in MathCAD

- Turn on the computer. The machines have been configured to boot right into Windows. Wait for the icons to appear in the screen.
- Insert your data diskette in drive A. You will use this diskette to save any files created in MathCAD.
- Load the tutorial by double-clicking on the **MathCAD** tutorial icon.
- Follow the directions in the screen making sure that you take notes of the commands and mouse actions that are not obvious to you.
- If another computer is available, open up a clean worksheet by double-clicking on the MathCAD icon. Use the worksheet to follow along the steps presented in the tutorial.

Exercises

▷ **Exercise 1.1** Compute the following expressions:

a) $23^3 - 41^2 + 24^{1.5}$.

b) $x^3 - 4x^2 + 5$ for $x = 1, 2, 3, 4, 5$.

c) $\tan \frac{\pi}{4} + \cos \frac{\pi}{3}$.

d) $\sqrt{\sin(e^{2.3}) + e^{\cos 3.2}}$.

e) $f(1.25)$ if $f(x) = \frac{\sqrt{x^2+1}}{x^3-1}$.

▷ **Exercise 1.2** Plot the given functions. Adjust the domain and ranges so as to exhibit the main features of the graphs.

a) $f(x) = x^2 - 1$.

b) $f(x) = x^4 - x^2$.

c) $h(t) = \frac{1}{x^2+4}$

d) $f(x) = \sin 2x + 2 \sin x$.

e) $h(r) = re^{-r}$