MATH.2720   Introduction to Programming with MATLAB
Basic MATLAB Functions

Practice Problems (some from Gilat, *MATLAB: An Introduction with Applications*)

1. Calculate $(-3.5)^3 + \dfrac{e^6}{\ln(524)} + 206^{1/3}$

2. Define the variables a, b, c, and d as follows: $a = 13, b = 4.2, c = 4b/a$ and $d = \dfrac{abc}{a+b+c}$.
   Evaluate $\dfrac{\sqrt{a^2+b^2}}{d-c} + \ln(|b-a+c-d|)$

3. Create the script file described in *Try 3.1.2* in section 3.1 of the textbook.

4. Create a script file that defines the variables $a = 1, b = 3$, and $c = 2$ and then calculates the roots of the quadratic $ax^2 + bx + c$ using the quadratic formula.

Homework (Due 2/1)

1. Read sections 2.1, 2.2, and 3.1 from the textbook, and answer Questions 1, 2, and 3 from section 3.1.

   Create a script file containing commands to carry out the following calculations. Use comments in your file to indicate the problem number.

2. The prices of an oak tree and a pine tree are $54.95 and $39.95, respectively. Find the total cost of 16 oak trees and 20 pine trees, rounded off to the nearest dollar.

3. The distance d from a point (x_0, y_0, z_0) to a plane $Ax + By + Cz + D = 0$ is given by

$$d = \frac{|Ax_0 + By_0 + Cz_0 + D|}{\sqrt{A^2 + B^2 + C^2}}$$

   Find the distance from the point $(8, 3, -10)$ to the plane $2x + 23y + 13z - 24 = 0$.

4. The monthly payment M on a loan amount of P for y years and interest rate r is given by

$$M = \frac{Pr/12}{1 - (1 + r/12)^{-12y}}$$

   Define the variables $P = 85000, y = 15$, and $r = 0.05$. Calculate both the monthly payment M and the total amount of money paid over the life of the loan.

5. The Anteing equation relates the vapor pressure p of a liquid to the absolute temperature T:

$$\ln(p) = A - \frac{B}{C+T}$$

   The unit of p are mm of mercury, the units of T are degrees Kelvin, and A, B, and C are material parameters. Calculate the vapor pressure of toluene at 315K given that $A = 16.0137, B = 3096.52$ and $C = -53.67$.