ECE 111 - Homework #2

Math 103 - Algebra, Functions & Solving f(x) = 0. Make-Up Homework Set for Fall 2024

Newton's Method

1) Let x and y be related by:

$$y = x + \frac{1}{x}$$

Use Newton's method to solve for x when

- y = 5
- y = 10

2) Let x and y be related by

$$y = \sin(2x)$$

$$y = 4 - x^2$$

Find all solutions in the range of (-4 < x < 4) using graphical methods. (Plot both functions on the same graph. The solution is when the two functions intersect.)

3) Find the solutions to problem #2 using Newton's method.

Let

$$y_1 = \sin(2x)$$

$$y_2 = 4 - x^2$$

$$e = y_1 - y_2$$

Find the solutions for f(x) = 0 using Netwon's method.

(over)

Newton's Method with a CdS Light Sensor

Assume the light - resistance relationship of a CdS light sensor:

$$R = 5000 \cdot (lux)^{-0.6} \Omega$$

$$e = R - R_0$$

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Lux = [10:0.1:100]';
R = 5000 * ( Lux .^ (-0.6) );
plot(Lux, R)
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4) Write a Matlab funciton which

- Is passes the light level in lux, and
- Returns e (the difference between R and R0)

5) Use Newton's method to find the temperature when

- R0 = 900 Ohms
- R0 = 600 Ohms

Newton's Method and a Voltage Divider

Assume

$$V = \left(\frac{R}{R+500} \right) \cdot 5V$$

$$e = V - V_0$$

6) Write a Matlab function which

- Is passed the temperature, T, and
- Returns the error, e.

7) Use Netwon's method to determine the temperature when

- V0 = 3.20V
- V0 = 2.20V