ECE 111 - Homework #2

Math 103 - Algebra, Functions & Solving f(x) = 0. Due Monday, January 22nd
Please submit via BlackBoard

Newton's Method

1) Let x and y be related by:

$$y = x \cdot \ln(x)$$

Use Newton's method to solve for x when

- $y = 5$
- $y = 10$

2) Let x and y be related by

$$y = \cos(3x)$$

$$y = (x+1)(x-2)$$

Find all solutions 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

$$y_1 = \cos(3x)$$

$$y_2 = (x+1)(x-2)$$

$$e = y_1 - y_2$$

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

(over)

Newton's Method with a Thermistor

Assume the temperature - resistance relationship of a thermistor is:

$$R = 2000 \cdot \exp\left(\frac{4200}{T+273} - \frac{4200}{298} \right) \Omega$$
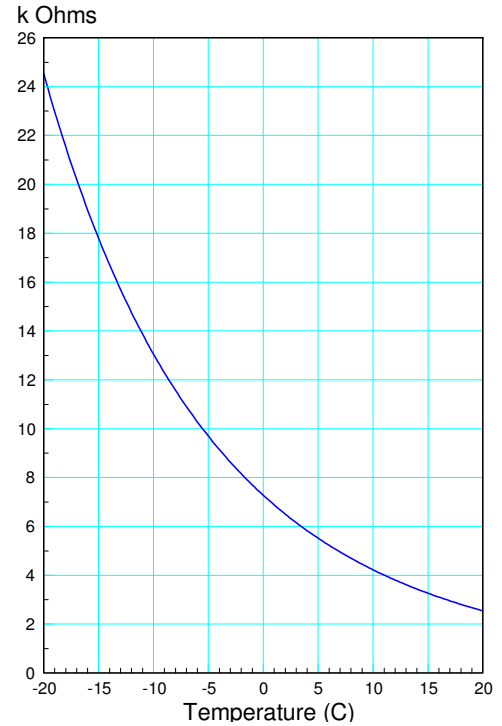
$$e = R - R_0$$

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T = [-20:0.2:20]';
R = 2000*exp( 4200./(T+273) - 4200/298 );
plot(T,R);
```

4) Write a Matlab funciton which

- Is passes the temeprature T, and
- Returns e (the difference between R and R0)

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

- R0 =5,000 Ohms
- R0 = 10,000 Ohms

k Ohms

Temperature (C)

Newton's Method and a Voltage Divider

Assume

$$V = \left(\frac{R}{R+4000} \right) \cdot 10V$$

$$e = V - V_0$$

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 = 8.00V
- V0 = 6.00V

Volts

Temperature (C)