THE UNIVERSITY OF TEXAS AT SAN ANTONIO
EE 3413
ANALYSIS AND DESIGN OF CONTROL SYSTEMS

HOMEWORK # 3
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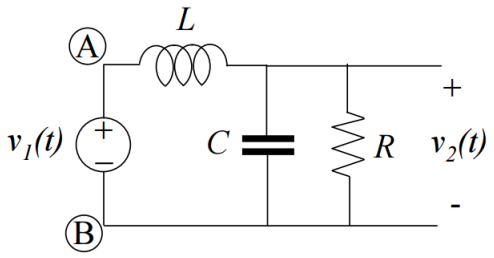
The objective of this homework is to test your understanding of the content of Module 3. Due date of the homework is: **Friday, February 5th, 2016.**

You have to upload a scanned version of your solutions on Blackboard. If you don't have a scanner around you, you can use Cam Scanner—a mobile app that scans images in a neat way, as if they're scanned through a copier. Here's the link for Cam Scanner: https://www.camscanner.com/user/download.

1. Linearize the following equation around $x_o = \pi/2$:

$$y = f(x) = x^{1/3} + \cos(x).$$

2. For this circuit:



find,

(a) $\dfrac{V_2(s)}{V_1(s)}$ for any R, L, C.

(b) $v_2(t)$ if $R = 1, L = 1, C = 1$, and

i. $v_1(t) = \delta(t)$, or

ii. $v_1(t) = 5$.

This means that you have two different input voltage signals. Each signal will give a different output $v_2(t)$ or $V_2(s)$.

After you analytically compute your answers, verify your solutions via MATLAB.