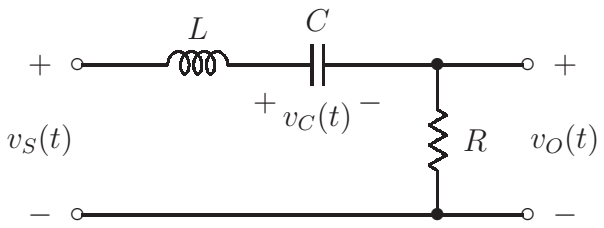
Recitation Problem Set 4 (For Tue. 2-13-07 recitation session)

1) Consider the following 2'nd order system with input $v_S(t)$ and output $v_O(t)$.



(a) Determine the differential equation that relates $v_S(t)$ and the capacitor voltage $v_C(t)$. Find ζ and ω_0 in terms of R, L, and C and rewrite the differential equation in terms of these two quantities.

(b) Express $v_O(t)$ in terms of ζ, ω_0, and $v_C(t)$ and its derivatives.

(c) Let $v_S(t) = V_A\, u(t)$ and compute the zero-state response of the system in terms of ζ and ω_0, assuming that $\zeta < 1$. **Hint:** Compute $v_C(t)$ in response to $v_S(t)$ first and then use the result of (b) to obtain $v_O(t)$ in response to $v_S(t)$.

2) Problem 7-66 in the book.

3) Problem 9-1 in the book.

4) Problem 9-4 in the book.

