Introduction to Time-Varying Electrical Networks : Week 11

Problem 1

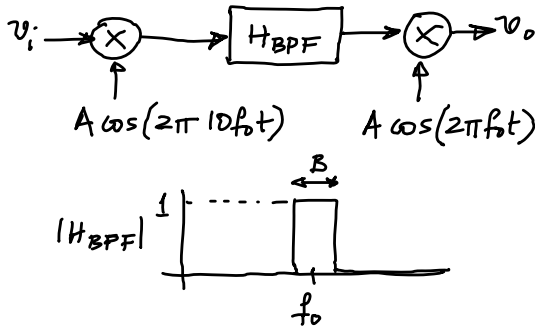

Figure 1: LPTV system for problem 1.

In the figure above, the bandpass filter is ideal; it is centered at f_o and has a narrow bandwidth, denoted by B. Determine all the frequencies in the input v_i that can result in a non-zero output at v_o.

Problem 2

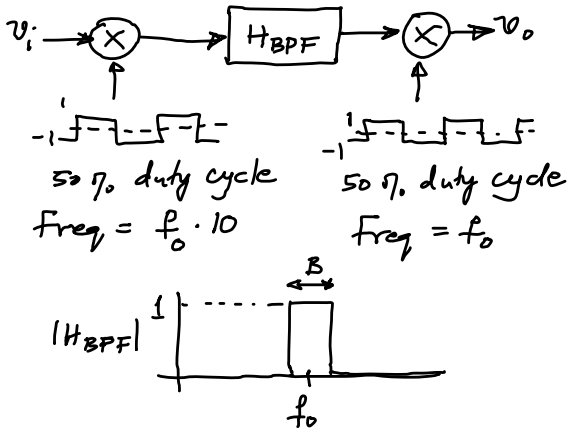

Figure 2: LPTV system for problem 2.

Repeat problem 1 for the system of Fig. 2.

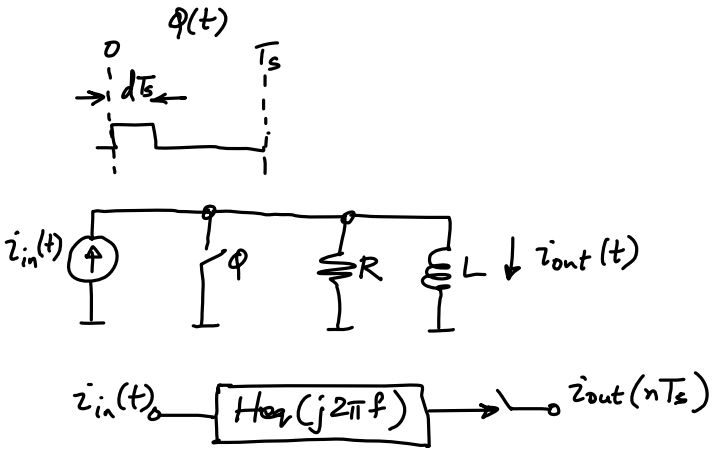

Figure 3: LPTV system for problem 3.

Problem 3

A switched RL network is shown in Fig. 3. Determine the transfer function of the equivalent LTI filter that relates the input $i_{in}(t)$ to the sampled output $i_{out}(nT_s)$. The switch is ideal, and is controlled by a periodically operated switch with period T_s and duty cycle d.