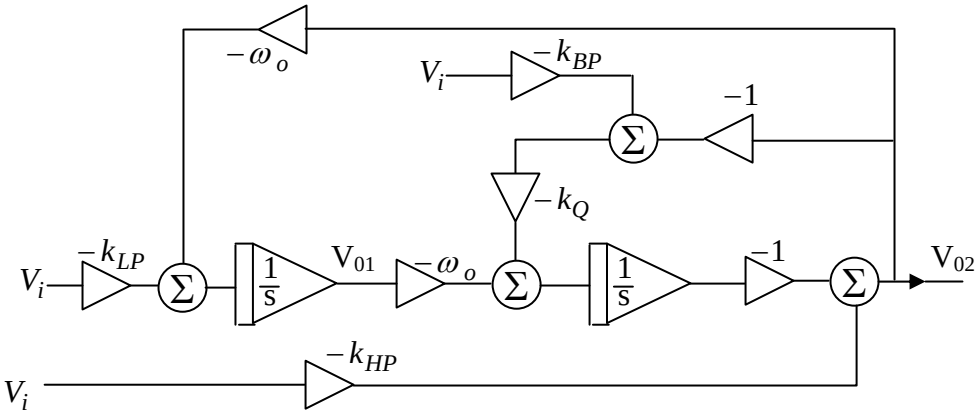
ELEN 458/622 (ESS) **Due: October 13, 2009**

Homework Assignment #3

Prob. 1 Obtain the transfer function V_{01}/V_{in} and V_{02}/V_{in} . Plot these transfer functions making $k_{HP}=1$



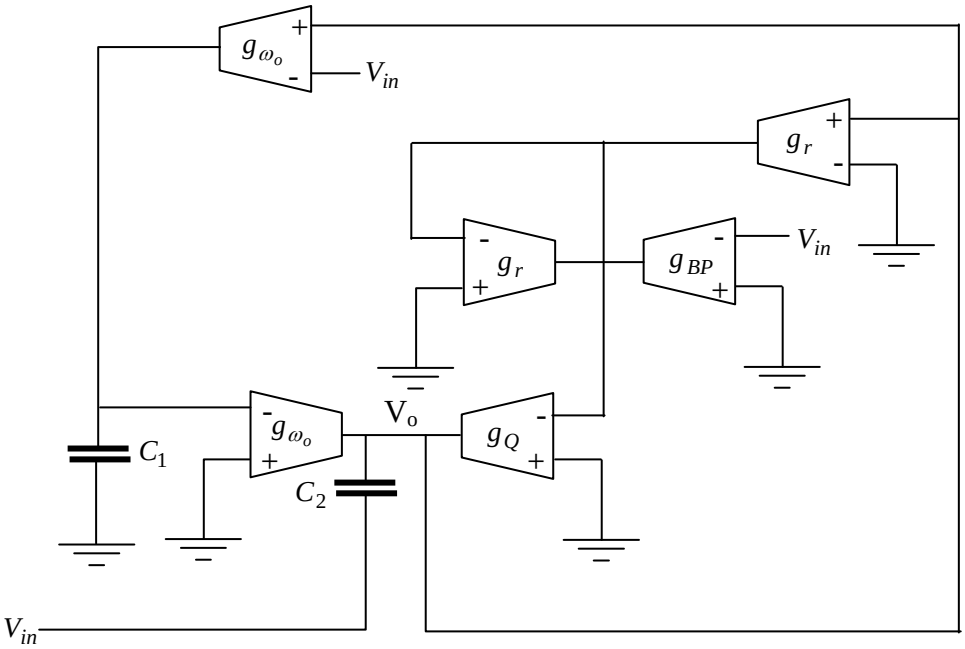
and $k_{LP}=\omega_o$ for two cases.

(i) Fix ω_o (arbitrarily chosen) and vary $k_{BP}=\{-10, \ldots, 10\}$ for $k_Q = 2\pi \times 10^2$.

(ii) Fix $k_{BP}=5$ and $k_Q = 4\pi \times 10^2$ and vary ω_o.

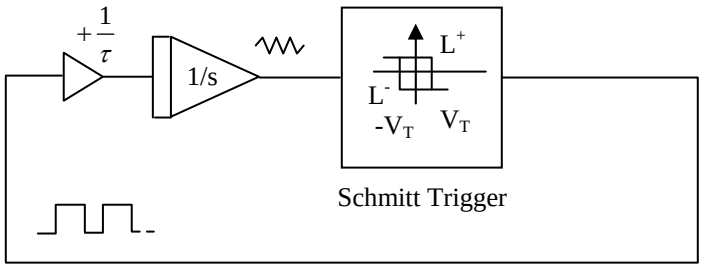
Problem 2. Propose an active RC structure and an OTA-C structure of the architecture of prob. 1. Verify your results via simulations. Assume ideal components.

Problem 3. Obtain the corresponding building block diagram of the OTA-C circuit shown below, and derive the transfer function. What type of filter is this?

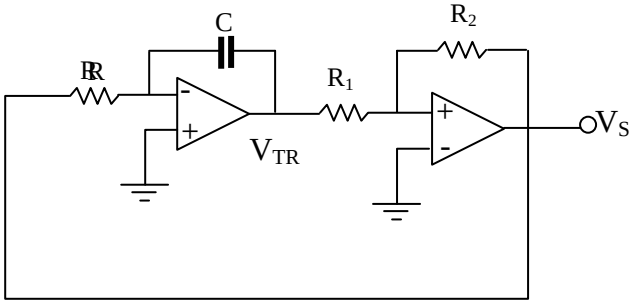


For 622 students.-

Design a relaxation oscillator as shown below. Obtain the expression of oscillation as a function of the time constant of the integrator, thresholds values and output of the comparator. Is the SR a critical parameter?



An example of an implementation



Design a fully-balanced version of this architecture for f_o=10KHz. Show your SPICE plots. You can use commercial Op Amp macromodels for the verification of your design.