

# FINAL EXAMINATION

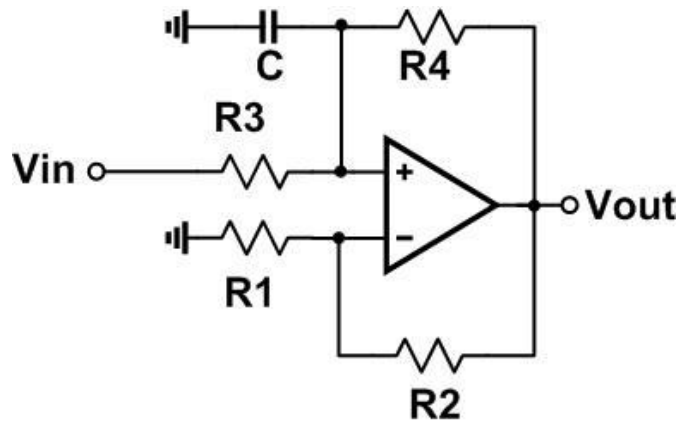
## Open Book

December 10, 2013 , 9:30-11:30 am

Prof. G. Temes

### GLSN 200

- A second-order filter has complex poles. The pole frequency is  $\omega_p = 2 \text{ Mrad/s}$ , and the pole Q is  $Q_p = 4$ . Find the group delay  $T_g(\omega)$  at  $\omega = \omega_p$ .
  - Find a simple estimation formula for  $T_g(\omega_p)$  for  $Q_p \gg 1$ .
- Find the transfer function  $H(s) = V_{out}(s)/V_{in}(s)$  of the circuit shown below. Assume  $R_1/R_2 = R_3/R_4$ .



- Find the transfer function  $H(s) = V_o(s)/V_{in}(s)$  of the circuit shown below.
  - Find a choice for the  $Y_i$  such that the circuit realizes a high-pass filter.

