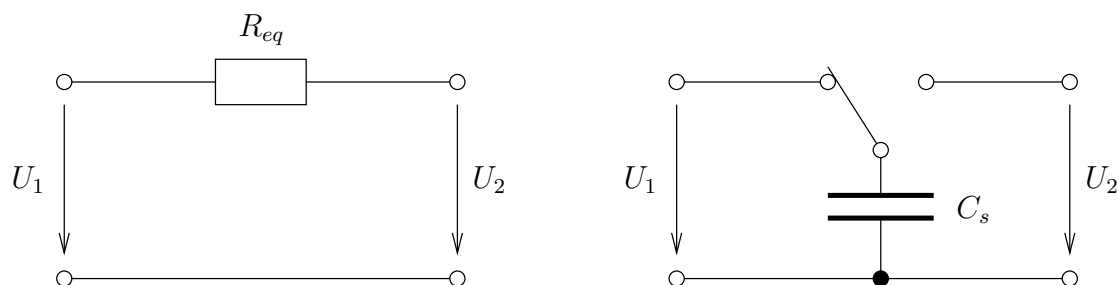


**Problem 1.5**

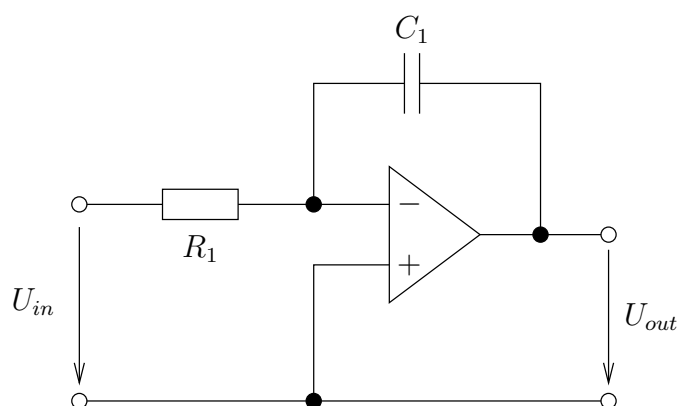
Given is a simple switched capacitor (SC) two-port which emulates a resistance:



- 1.5.1 Give the expression for the calculation of the equivalent resistance  $R_{eq}$ .
- 1.5.2 Derive a simple RC-low-pass consisting of of resistance  $R_1 = 10 \text{ M}\Omega$  an a capacitor  $C_1 = 100 \text{ pF}$ . Calculate the cut-off frequency  $\omega_0$ .
- 1.5.3 Sketch the equivalent SC circuit and calculate the value for the switched capacitor in the case of a clock-frequency  $f_s = 10^5 \text{ Hz}$ .

**Problem 1.6**

Given is an analogue inverting integrator:



- 1.6.1 Calculate the system function  $H_L(p)$ .
- 1.6.2 Calculate the system function  $H_L(p)$  if a SC is being implemented.
- 1.6.3 Describe how it is possible to develop a non-inverting integrator without implementing a further operational amplifier.
- 1.6.4 Describe the function of the SC inverting integrator by analysing the system at each phase of the clock-signal.