

4. AC Filter (5 points) — Jaan Kalda.

An alternating voltage with amplitude V_0 and circular frequency ω_0 is applied to the circuit shown below.

- i) (2 points) For which circular frequency ω_0 would the output voltage be infinite?
- ii) (3 points) Now let the circular frequency ω be twice the value found in the previous task, $\omega = 2\omega_0$. The capacitance C_1 is chosen such that the phase difference φ between the input and output voltages is maximum (parameters C_0 , L and R are not changed). Find the phase shift φ and the output voltage amplitude V_{out} .

