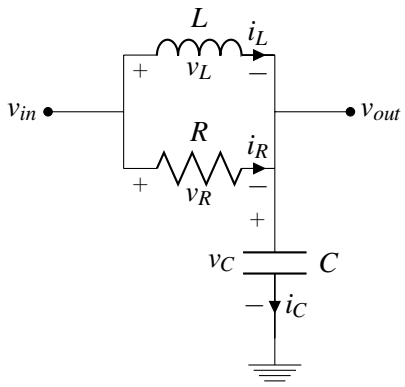
EECS 16B Designing Information Devices and Systems II
Spring 2016 Anant Sahai and Michel Maharbiz **Discussion 10A**

1. An RLC example



For the RLC filter above, with component values $R = 1\,\text{k}\Omega$, $C = 10\,\text{nF}$, and $L = 1\,\mu\text{H}$,

(a) Find the transfer function. The easiest way is probably to treat it as a voltage divider.

(b) Create a Bode plot of that transfer function. Please do it step by step and use the Bode plot table in the next page.

(c) (Optional) Connect a DC voltage V_s source to v_{in}, derive the differential equations to describe the changes of i_L and v_C.

$$\begin{pmatrix} \frac{di_L}{dt} \\ \frac{dv_C}{dt} \end{pmatrix} = A \begin{pmatrix} i_L \\ v_C \end{pmatrix} + B \tag{1}$$