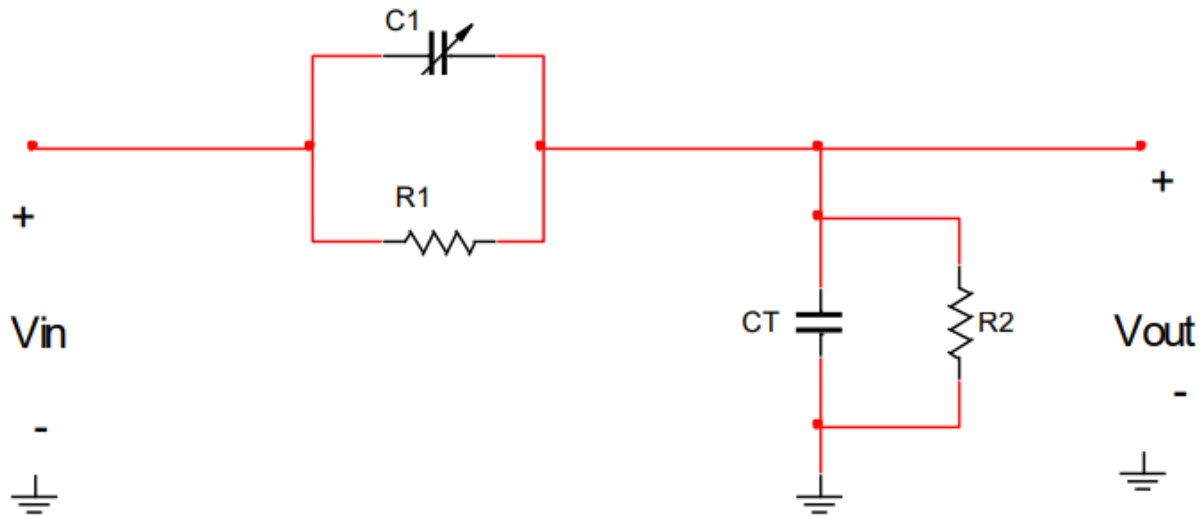


Lecture 2, Two-Ports and Dynamics Review
E151/3 F17 – Matthew Spencer

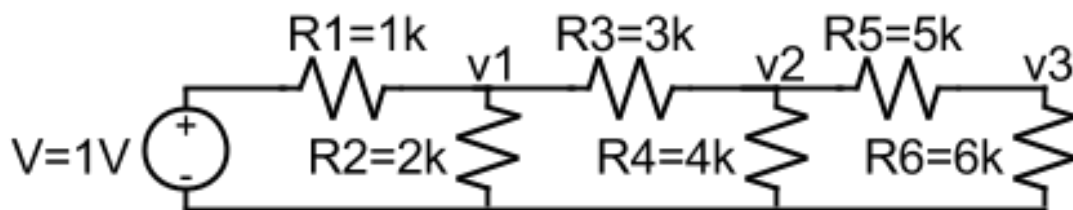


1. Consider the above representation of a 10x scope probe.

(a) Derive an expression for the frequency response of this probe in terms of R_1 , R_2 , C_1 and C_T .

(b) Find the conditions under which the response does not vary with frequency. Show this is true using your frequency response calculations.

(c) Now assume that $R_2 \cdot C_T > R_1 \cdot C_1$, but very close, sketch the Bode diagram of the frequency response. Mark the breaking frequencies in terms of R 's and C 's. Also sketch a step response to a 1V step.



2. Find v_1 and v_3

(a) by any means necessary (probably invoking Thevenin).

(b) by modeling components between them as a two port network.

This problem is easier if you find your answers in terms of unsimplified algebraic expressions (i.e.: $||$ is a fine operator to leave in your work) and then substitute numbers at the end.