

Circuits II

EE221

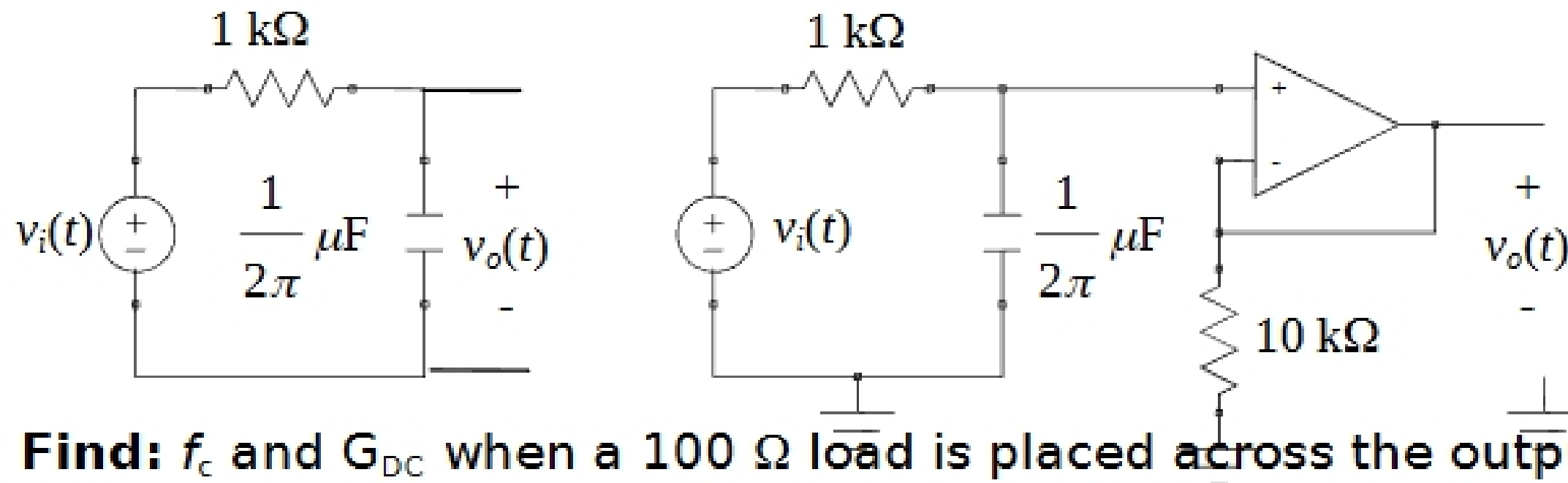
Unit 6

Instructor: Kevin D. Donohue

Active Filters, Connections of Filters, and
Midterm Project

Load Effects

- If the output of the filter is not properly buffered, then for different loads, the frequency characteristics of the filter will change.
- **Example:** Both low-pass filters below have $f_c = 1$ kHz and $G_{DC} = 1$ (or 0 dB).



- **Find:** f_c and G_{DC} when a $100\text{ }\Omega$ load is placed across the output $v_o(t)$.
- **Result:** $f_c = 11$ kHz and $G_{DC} = 1/11$ (or -21 dB) for the passive circuit, while f_c and G_{DC} remain unchanged for the active circuit.

Filter Order

- The order of a filter is the order of its transfer function (highest power of s in the denominator). If the filter order is increased, a sharper transition between the stopband and passband of the filter is possible.
- **Example:** For the two low-pass filters, determine circuit parameters such that f_c is 100 Hz, and $G_{DC} \approx 1586$. Plot transfer function magnitudes to observe the transition near f_c .

