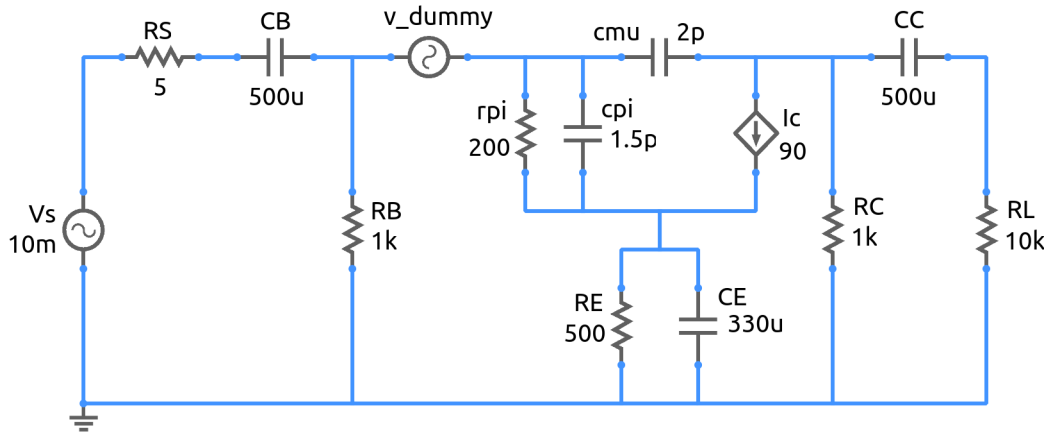


ce_amp_2.sqproj



Small-signal equivalent circuit of
common-emitter amplifier
(all frequencies)

A representative small-signal equivalent circuit of a common-emitter amplifier is shown in the figure. The coupling capacitances (C_B and C_C) and the bypass capacitance C_E affect the low-frequency performance of the amplifier whereas the device capacitances (C_π and C_μ) affect the high-frequency performance.

Exercise Set

1. For the component values given in the figure, calculate the mid-band gain $A_V (= v_o/v_s)$. Verify with simulation.
2. Plot the frequency response (i.e., gain versus frequency on log-log scale). By changing the capacitance values C_π and C_μ one at a time, find out which capacitance is playing a dominant role in determining the high-frequency response of the amplifier. Explain your observations.

References

1. A. S. Sedra, K. C. Smith, and A. N. Chandorkar, *Microelectronic Circuits: Theory and Applications*, Fifth edition, Oxford University Press, 2009.
2. P. R. Grey and R. G. Meyer, *Analysis and Design of Analog Integrated Circuits*, John Wiley and Sons, 1995.