

An “all-pass” filter has a magnitude of 1 (or some constant) at all frequencies, but has a frequency-dependent phase-shift. The transfer function is:

$$T(s) = G_0 \frac{s^2 - s \left(\frac{\omega_0}{Q_P} \right) + \omega_0^2}{s^2 + s \left(\frac{\omega_0}{Q_P} \right) + \omega_0^2}$$

(a) Calculate the magnitude and phase expressions for the all-pass transfer function.

(b) Show that the circuit below exhibits an all-pass type of response. (Basically, the output is the difference between a simple voltage divider and an *RLC* bandpass.)

