there are no cancellations of common poles
os, the poles of a network function indicate
of the natural response.

linear system can be simulated with integra-
lers, and scalers (i.e., with an analog com-

stems are often represented by block dia-

dback can improve system performance and
sed for purposes of control.

Laplace transform is a linear transforma-
can be used to solve linear differential equa-
analyze linear circuits.

12. The inverse Laplace transform can be found by using a table of transforms and various transform properties, as well as partial-fraction expansions.

13. The impedance of an R-ohm resistor is R, of an L-henry inductor is Ls, and of a C-farad capacitor is $1/Cs$.

14. An inductor (or a capacitor) with a nonzero initial condition can be modeled by an independent source and an inductor (or capacitor) with a zero initial condition.

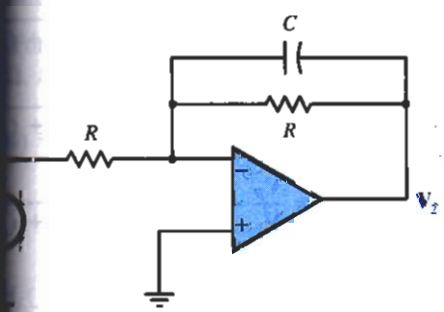
15. Circuit analysis using Laplace transforms results in complete (both forced and natural) responses.

Problems

tch the phase response ang($\mathbf{V}_2/\mathbf{V}_1$) versus
high-pass filter given in Fig. 5.5 on p. 269.

r the circuit given in Fig. 5.5 on p. 269,
e capacitor C with an inductor L, and sketch
response ang($\mathbf{V}_2/\mathbf{V}_1$) versus ω for the re-
w-pass filter.

tch the amplitude response of $\mathbf{V}_2/\mathbf{V}_1$ for the
ircuit shown in Fig. P5.3. Determine the half-
equency. What type of filter is this circuit?



how that for the circuit given in Fig. P5.4 the
transfer function is

$$) = \frac{\mathbf{V}_2}{\mathbf{V}_1} = \frac{R_2(1 + j\omega R_1 C_1)}{(R_1 + R_2) + j\omega R_1 R_2 (C_1 + C_2)}$$

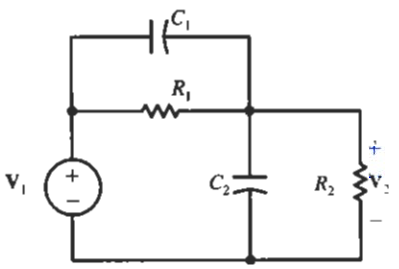


Fig. P5.4

5.5 For the circuit shown in Fig. P5.4, suppose that $R_1 = R_2 = R$ and $C_1 = C_2 = C$. Sketch the amplitude response and the phase response of $\mathbf{V}_2/\mathbf{V}_1$.

5.6 For the circuit shown in Fig. P5.4, suppose that $R_1 = R_2 = R$, $C_1 = C$ and $C_2 = 0$ F. Sketch the amplitude response of $\mathbf{V}_2/\mathbf{V}_1$. What is the half-power frequency?

5.7 For the circuit shown in Fig. P5.4, suppose that $R_1 = R_2 = R$, $C_1 = 0$ F and $C_2 = C$. Sketch the amplitude response of $\mathbf{V}_2/\mathbf{V}_1$. What is the half-power frequency?

5.8 For the op-amp circuit shown in Fig. P5.8, sketch the amplitude response of $\mathbf{V}_2/\mathbf{V}_1$, indicating the half-power frequency. What type of filter is this circuit?