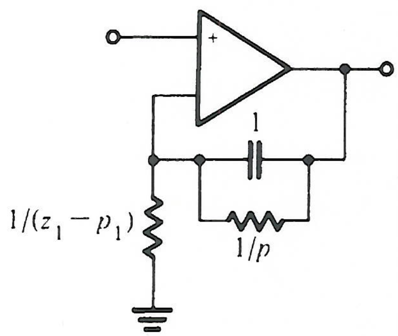

FIGURE 4.13

and from this the circuit of Fig. 4.14b is identified. Each of the two circuits found requires that $z_1 < p_1$ and $K = p_1/z_1$. These circuits are shown in Table 4.3.

Example 4.3 First we observe that the methods we have developed do not apply to the transfer function considered in Example 4.1. If we consider the $T(s)$ of Example 4.2 and the circuit of Fig. 4.14b, then the element values become those shown in Fig. 4.15a. If we scale frequency such that $k_f = 10^3$, and then scale magnitude with $k_m = 10^4$, then the circuit values of Fig. 4.15b are found. This particular realization gives us a gain of $K = p_1/z_1$ = ~~12~~, which is twice that specified by Eq. (4.19). To meet the specification exactly, it is
6 necessary to reduce the gain by ½, which is done with a voltage divider at the output.

The method that has been illustrated in this section and the preceding one can be summarized in a number of steps:

1. Reduce Bode plot information (or the equivalent) to values of K, p_1, and z_1.
2. Look in the tables provided (a catalog) for a suitable realization in terms of pole and zero locations. Determine element values.
3. If any element values are awkward, try another realization, or derive one not in the catalog.
4. Frequency scale if this is called for in the specifications.
5. Magnitude scale to get convenient element values.

Example 4.4 To illustrate these steps, we wish to design a circuit to satisfy the requirements shown in Fig. 4.16a. The circuit has the purpose of providing 6 dB of loss at low frequencies, but no loss at high frequencies. The figure shows only the asymptotic Bode plot. From the analysis of Fig. 4.16b we see that $A(\omega)$ is made up from three factors: a con-

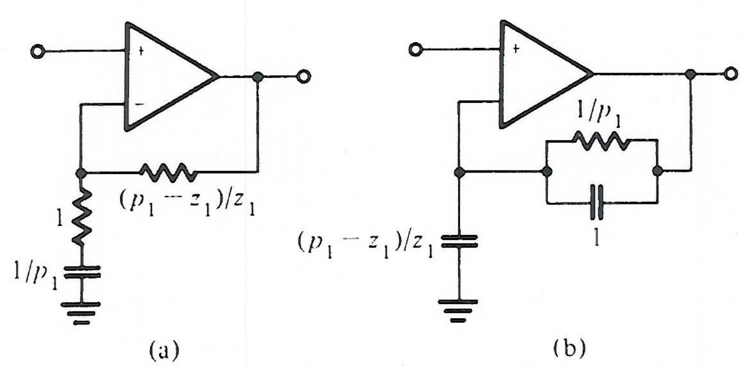

FIGURE 4.14