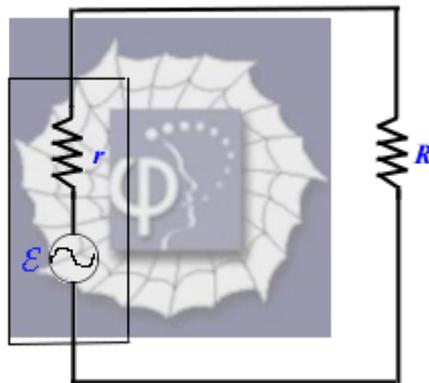


545.

Problem 39.43 (RHK)

In the circuit shown let the rectangular box on the left represent the (high-impedance) output of an audio amplifier, with $r = 1000 \Omega$. Let $R = 10 \Omega$ represent the (low-impedance) coil of a loud speaker. We have to match the impedances by using a suitable transformer.



Solution:

For impedance matching we need a transformer with primary and secondary turns N_p and N_s suitably fixed such that

$$r = \left(\frac{N_p}{N_s} \right)^2 R.$$

In our problem the low-impedance to be matched is the resistance of the loud speaker coil, $R = 10 \Omega$, with the high-impedance of the audio amplifier, $r = 1000 \Omega$.

Therefore,

$$\frac{r}{R} = \left(\frac{N_p}{N_s} \right)^2 = \frac{1000}{10},$$

$$\therefore \left(\frac{N_p}{N_s} \right) = 10.$$

For impedance matching we need a transformer with

$$\left(\frac{N_p}{N_s} \right) = 10.$$

