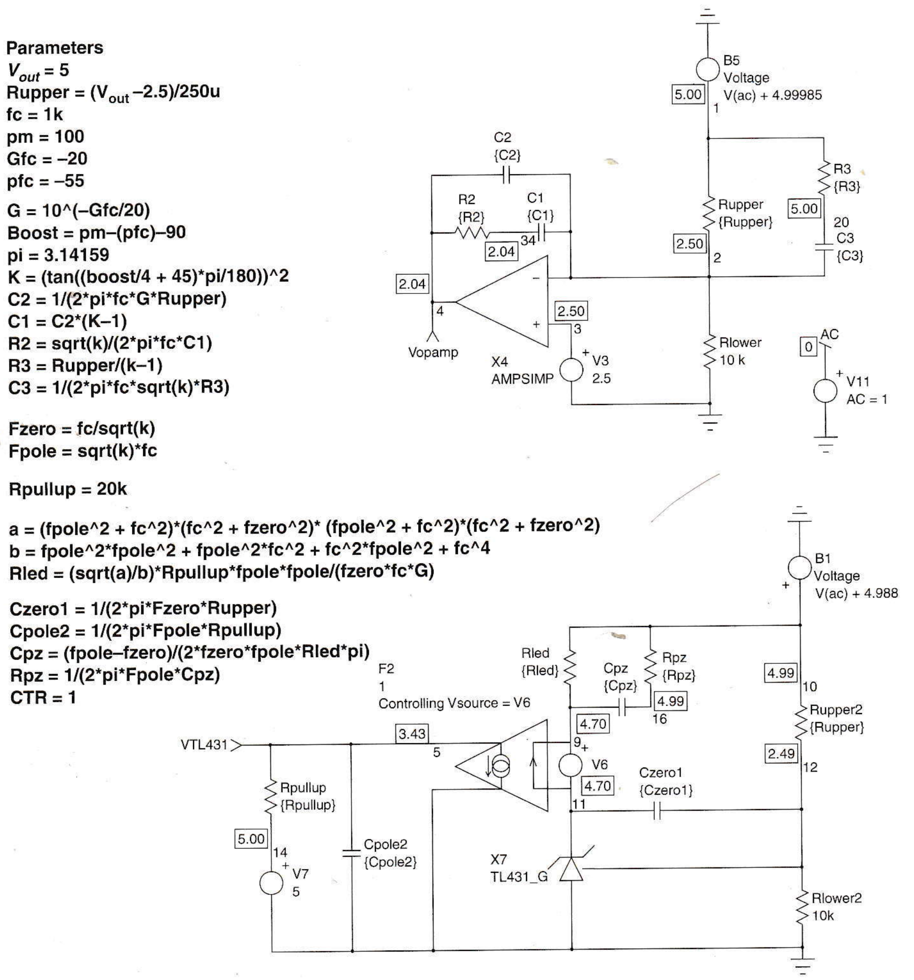

FIGURE 3-43 Placing an *RC* network in parallel with the LED resistor makes the type 3 amplifier!

Extracting the value of R_{LED} from the module expression leads to the following (complicated) result:

$$R_{LED} = \frac{\sqrt{(f_{p1}^2 + f_c^2)(f_{z1}^2 + f_c^2)(f_{p2}^2 + f_c^2)(f_{z2}^2 + f_c^2)}}{f_{p1}^2 f_{p2}^2 + f_{p2}^2 f_c^2 + f_{p1}^2 f_c^2 + f_c^4} \frac{CTR \cdot f_{p1} f_{p2} R_{pullup}}{f_{z2} f_c G} \qquad (3\text{-}73)$$

Fortunately, if poles and zeros are coincident (respectively f_p and f_z), the formula simplifies to

$$R_{LED} = \frac{(f_z^2 + f_c^2)}{(f_p^2 + f_c^2)} \frac{f_p^2 R_{pullup} \mathrm{CTR}}{f_c f_z G} \qquad (3\text{-}74)$$

Thanks to the above equations, we can derive the value of R_{LED}, given the gain needed at the crossover frequency. Now, manipulating Eqs. (3-68a) and (3-69), we can compute a