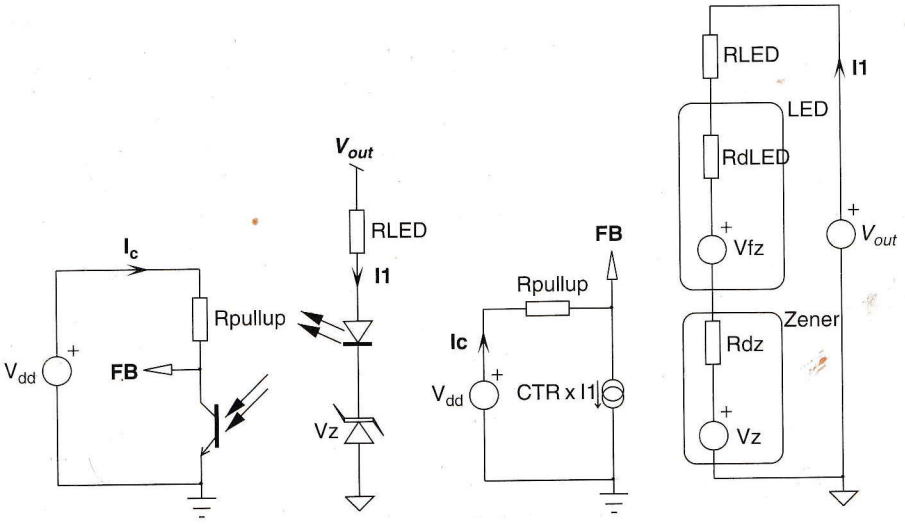

FIGURE 3-36 The small-signal model includes various dynamic resistors, but they are of low value compared to the series resistor R_{LED}.

This equation describes the "fast lane" gain that you simply cannot roll off. It also sheds light on the selection of R_{LED}: it obviously cannot be made solely on bias current considerations as it affects the loop gain. Bias current will rely on the resistor R_{bias} whose current does not cross the optocoupler LED and thus does not play a role in the gain definition. For Fig. 3-35b solution B, the result is almost similar to the Eq. (3-55) result, except that there is no phase reversal as with the common collector structure.

Once the operating principle is understood, the final TL431 representation makes more sense, as Fig. 3-37 shows. You can see the standard op amp having a capacitor C_{zero} but followed by an adder network representative of the fast lane. Note in Fig. 3-35b that the LED

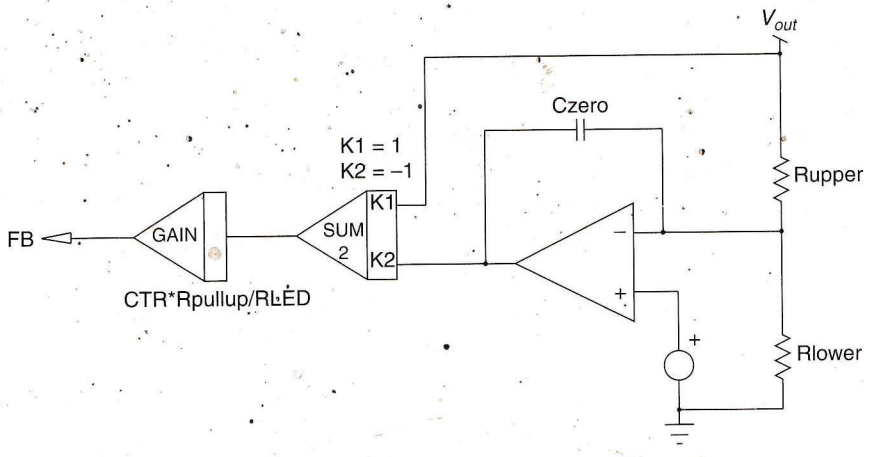

FIGURE 3-37 From this sketch, the fast lane can easily be identified.