This circuit can be understood by applying Kirchhoff's voltage law to the left-hand loop. We have:

\[-V_{\text{in}} + I_B R_B + V_{\text{BE}} + I_E R_E = 0.\]

In the linear regime, \(I_E = (1+\beta)I_B\) so:

\[V_{\text{out}} = I_E R_E = (V_{\text{in}} - V_{\text{BE}}) R_E / [R_E + R_B / (1+\beta)] \approx V_{\text{in}} - V_{\text{BE}}\]

since \(\beta \gg 1\). To within an offset of \(V_{\text{BE}}\), the magnitude of output is the same as the input.

The input resistance, found by opening the dependent current source \(I_c\) and shorting the voltage drop \(V_{\text{BE}}\), is just:

\[R_{\text{in}} = V_B / I_B = I_E R_E / I_B = (1+\beta) R_E.\]

So we see that the emitter-follower functions as a high impedance input.

The output resistance, found similarly by opening the dependent current source \(I_c\) and shorting the voltage sources \(V_{\text{BE}}\) and \(V_{\text{in}}\), is just

\[R_{\text{out}} = V_E / I_E = I_B R_B / I_E = R_B / (1+\beta).\]

This is just the resistance of the source divided by the gain.

Both relations generalize to

\[Z_{\text{in}} = (1+\beta) Z_E.\]

and

\[Z_{\text{out}} = Z_{\text{source}} / (1+\beta).\]