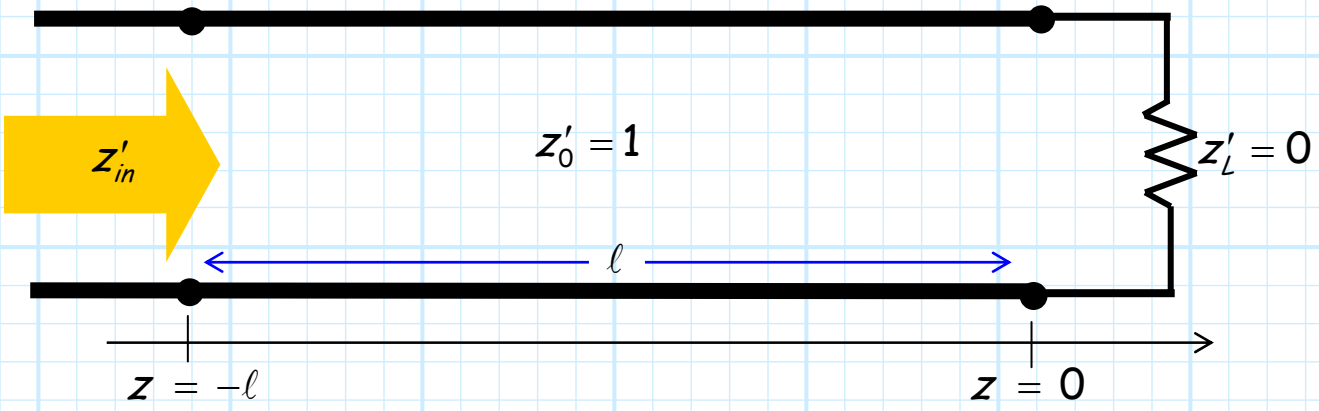
Example: The Input Impedance of a Shorted Transmission Line

Let's determine the input impedance of a transmission line that is terminated in a **short circuit**, and whose length is:

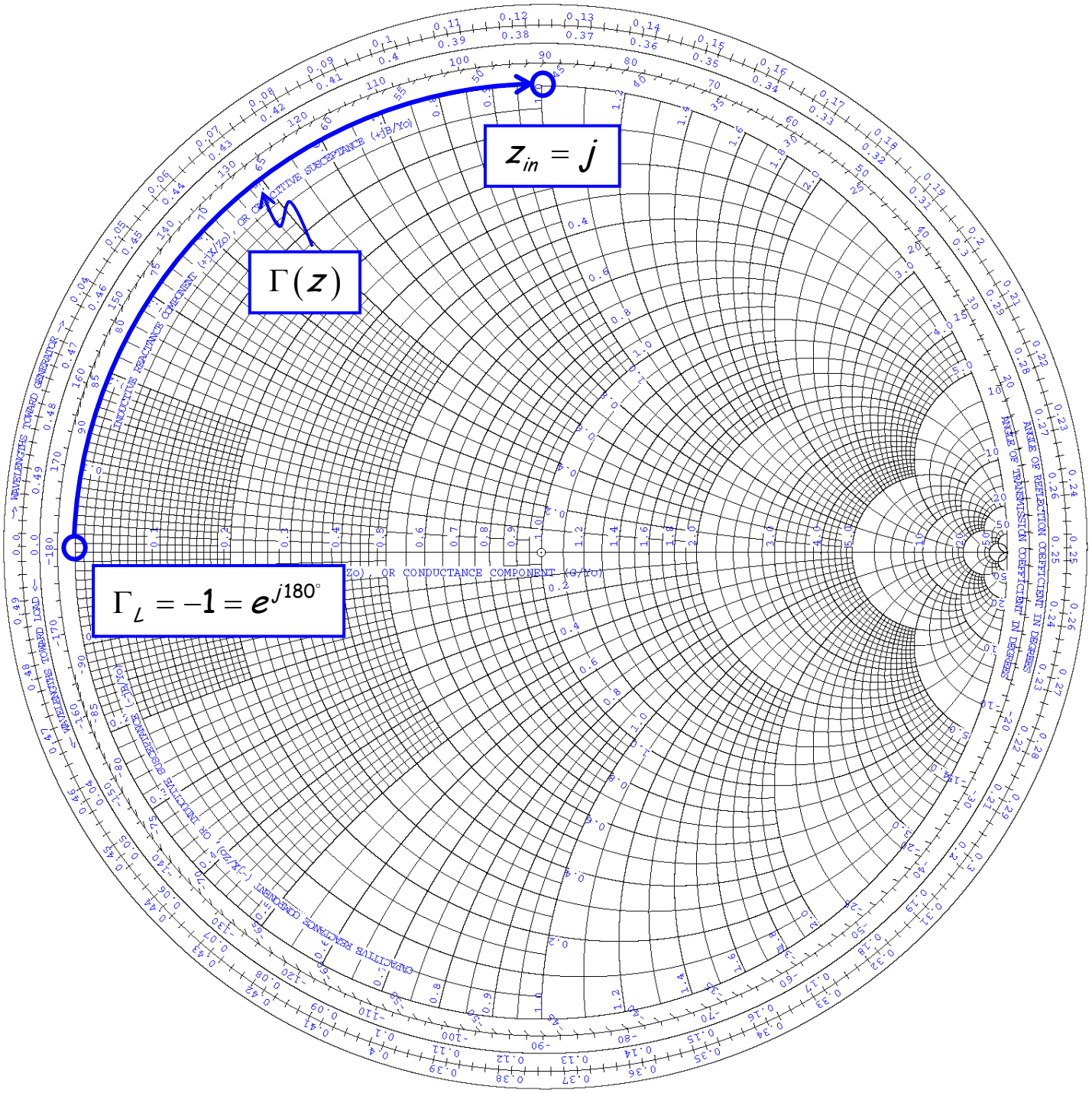
a) $\ell = \lambda/8 = 0.125\lambda \quad \Rightarrow \quad 2\beta\ell = 90^\circ$

b) $\ell = 3\lambda/8 = 0.375\lambda \quad \Rightarrow \quad 2\beta\ell = 270^\circ$



a) $\ell = \lambda/8 = 0.125\lambda \quad \Rightarrow \quad 2\beta\ell = 90^\circ$

Rotate **clockwise** 90° from $\Gamma = -1.0 = e^{j180^\circ}$ and find $z'_{in} = j$.



b) $\ell = {}^{3\lambda}\!/_{8} = 0.375\lambda \quad \Rightarrow \quad 2\beta\ell = 270^\circ$

Rotate **clockwise** 270° from $\Gamma = -1.0 = e^{j180^\circ}$ and find $z'_{in} = -j$.