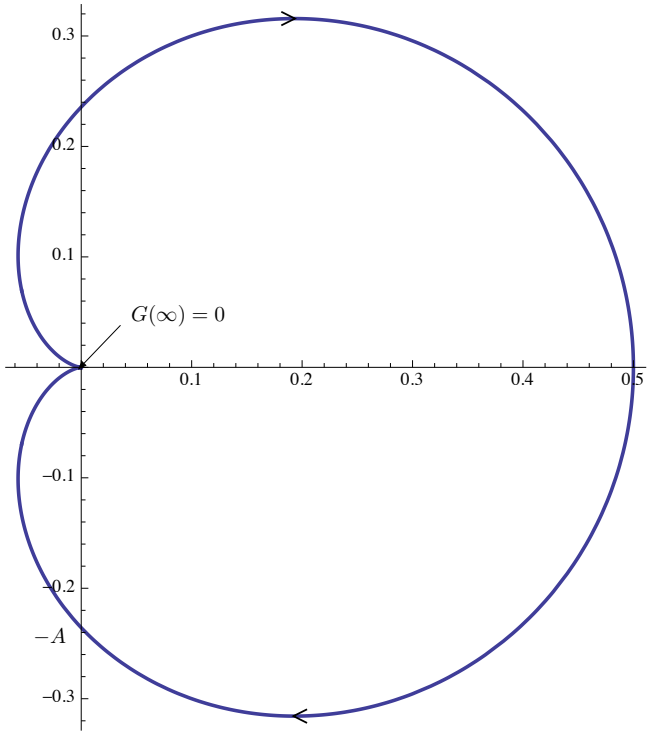
Example 1: Applying the Nyquist Criterion

$$G(s) = \frac{1}{(s+1)(s+2)} \qquad \text{(no open-loop RHP poles)}$$

Nyquist plot:



$$\#(\circlearrowleft \text{ of } -1/K)$$
$$= \#(\text{RHP CL poles}) - \underbrace{\#(\text{RHP OL poles})}_{=0}$$

$\Longrightarrow K \in \mathbb{R}$ is stabilizing if and only if

$$\#(\circlearrowleft \text{ of } -1/K) = 0$$

- If $K > 0$, $\#(\circlearrowleft \text{ of } -1/K) = 0$
- If $0 < -1/K < 1/2$, $\#(\circlearrowleft \text{ of } -1/K) > 0 \Longrightarrow$ closed-loop stable for $K > -2$