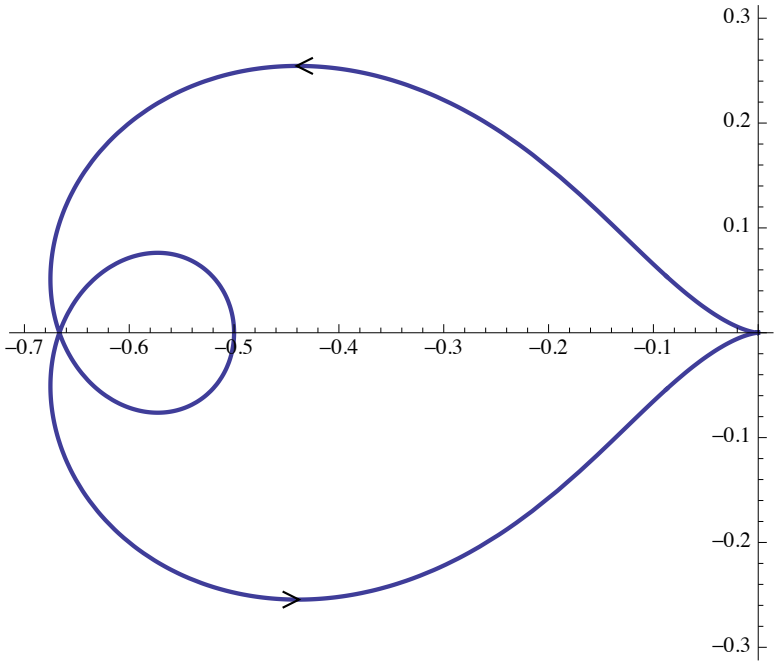
Example 3: Applying the Nyqiust Criterion

$$G(s) = \frac{s-1}{s^3 + s^2 - s + 2}$$

(2 open-loop RHP poles)

Nyquist plot:



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

$$\#(\circlearrowleft \text{ of } -1/K) = -2$$

Which points $-1/K$ are encircled twice $\circlearrowleft$ by this Nyquist plot?

$$\#(\circlearrowleft \text{ of } -1/K)$$
$$= \#(\text{RHP CL poles}) - \underbrace{\#(\text{RHP OL poles})}_{=2}$$

only $-2/3 < -1/K < -1/2$

$$\Longrightarrow \frac{3}{2} < K < 2$$