

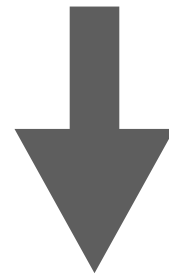
# Frequency Response Techniques in Feedback Control Systems

[https://github.com/mertankarali/Lecture-Notes/tree/master/METU-EE302/Frequency\\_Response](https://github.com/mertankarali/Lecture-Notes/tree/master/METU-EE302/Frequency_Response)

Part I: Polar Plot

Part II: Nyquist Plot

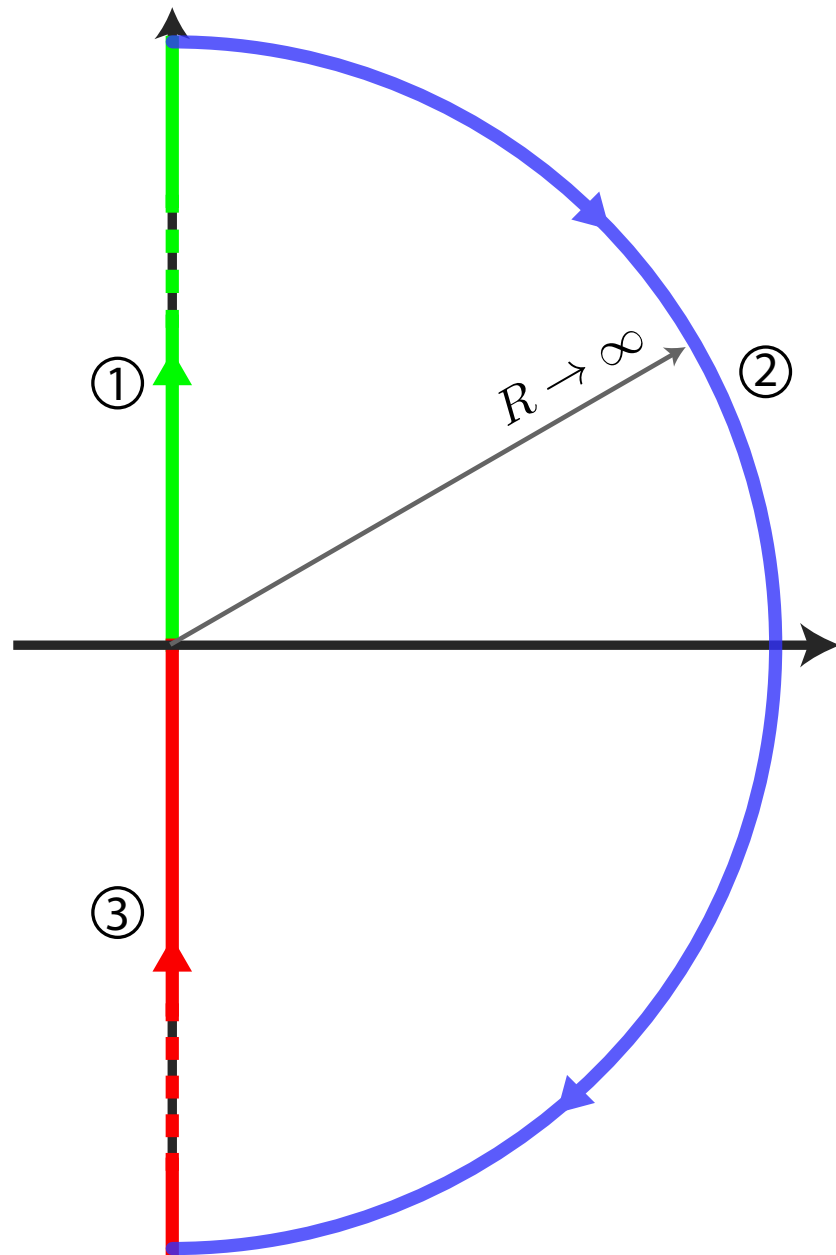
Part III: Nyquist Stability



Part IV: Nyquist Stability - OL Poles on the  $j\omega$  axis

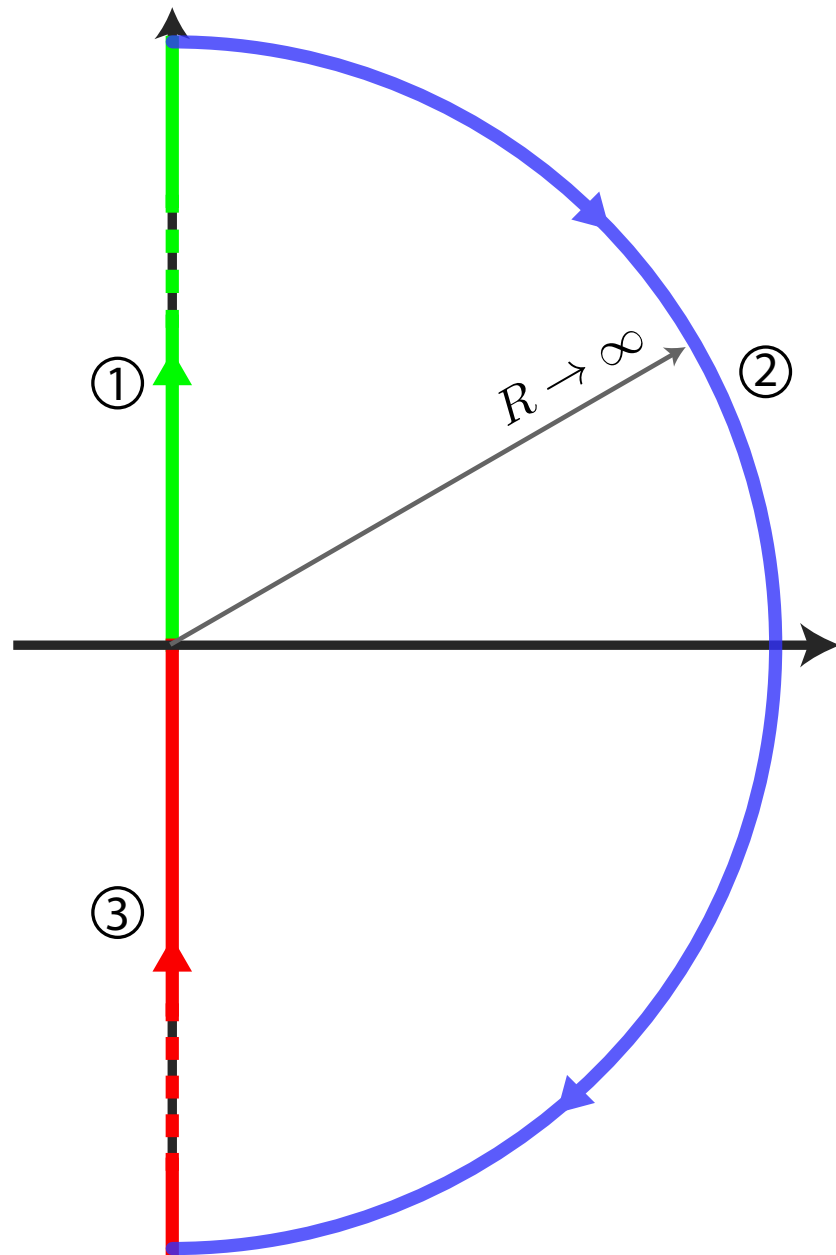
$G(s)$  : no poles/zeros on  $j\omega$  axis

Nyquist Contour



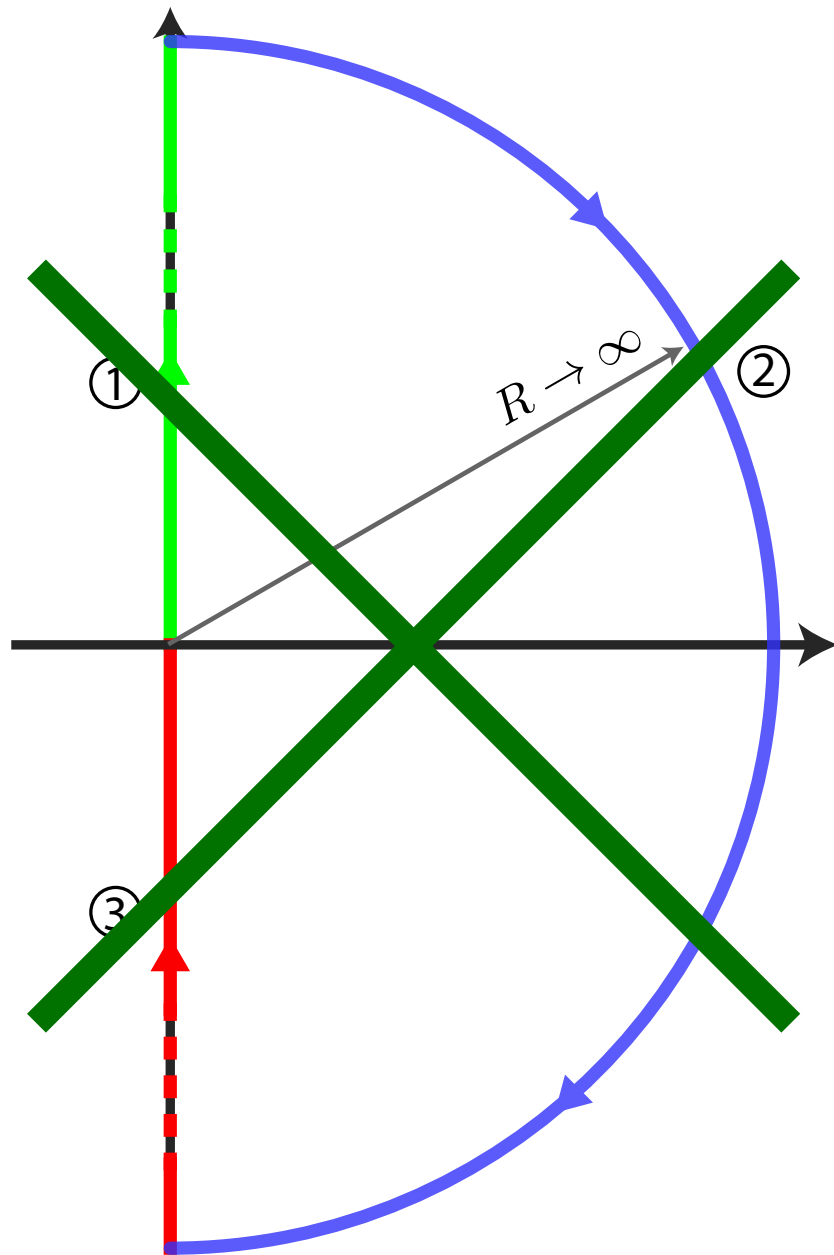
$G(s)$  : no poles/zeros on  $j\omega$  axis

Nyquist Contour

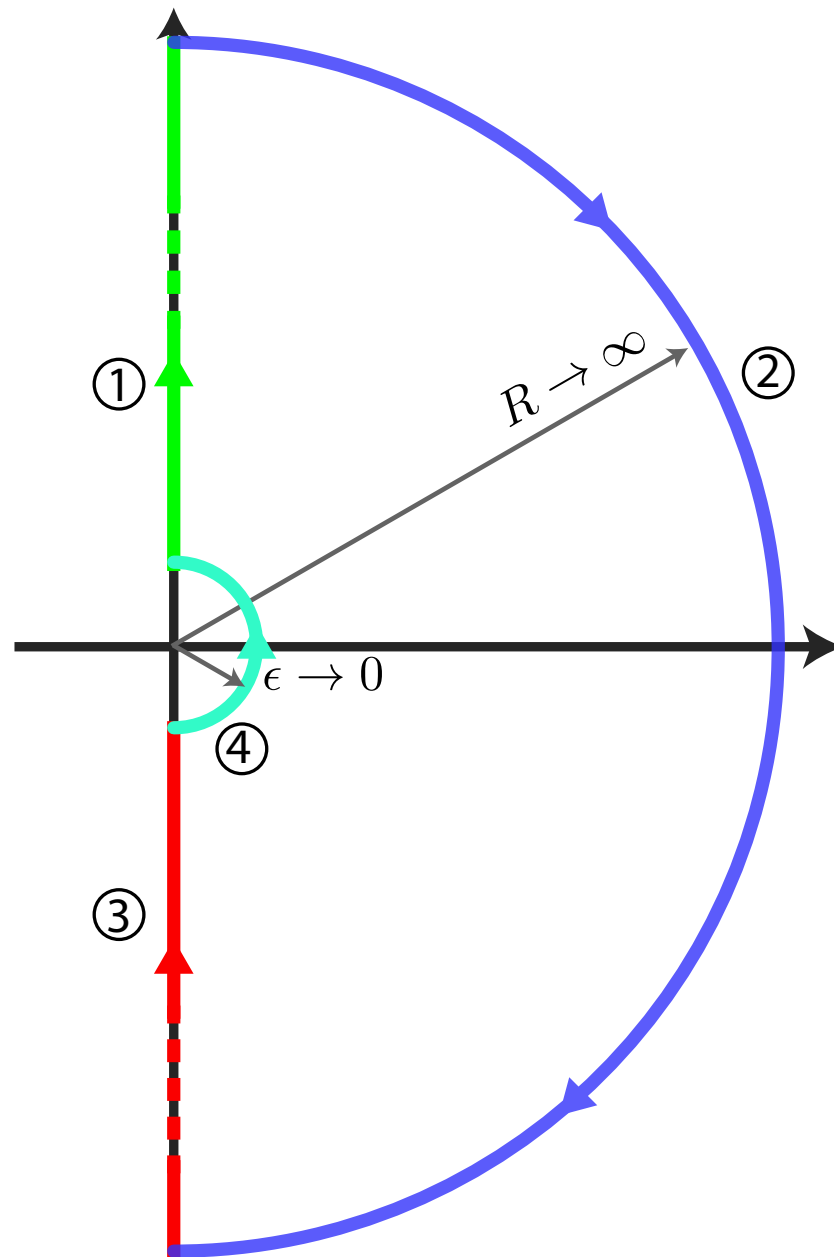


$G(s)$  : pole(s) at origin

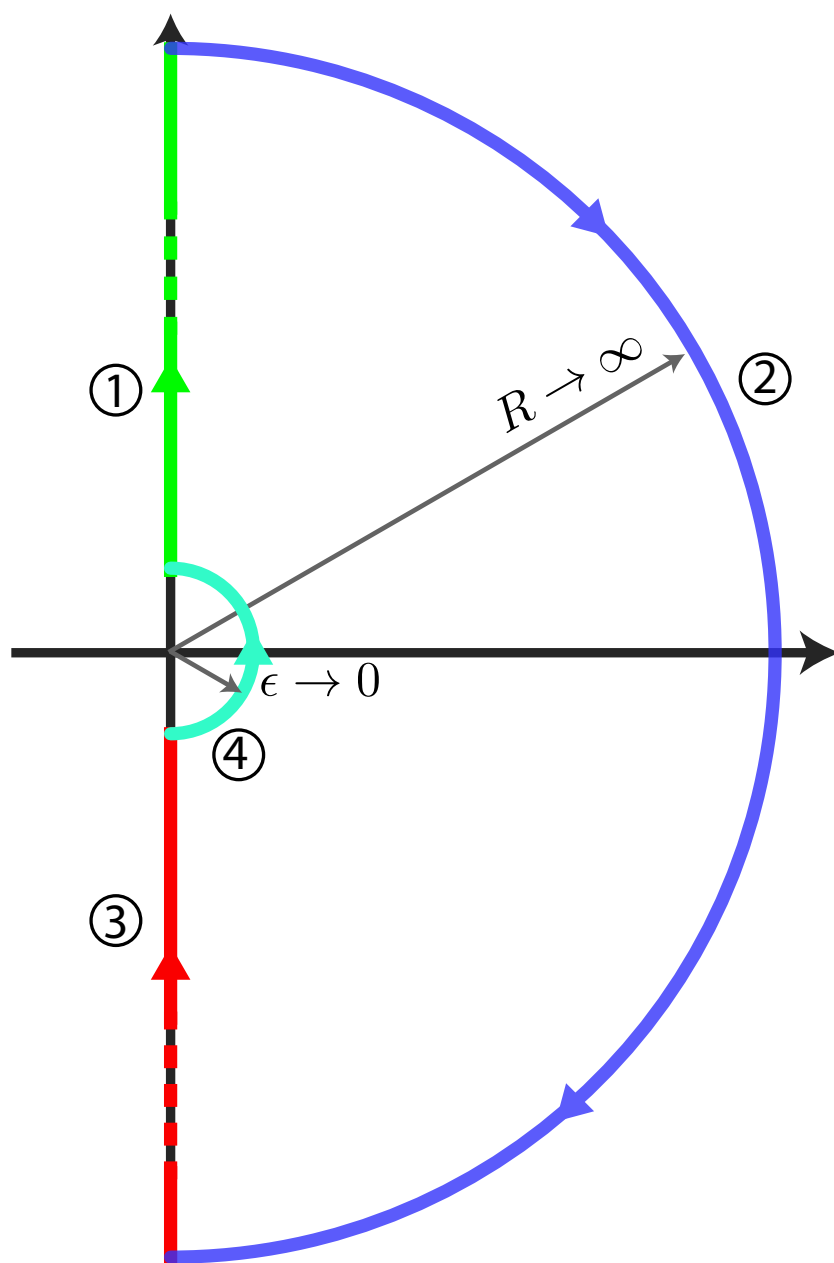
Nyquist Contour



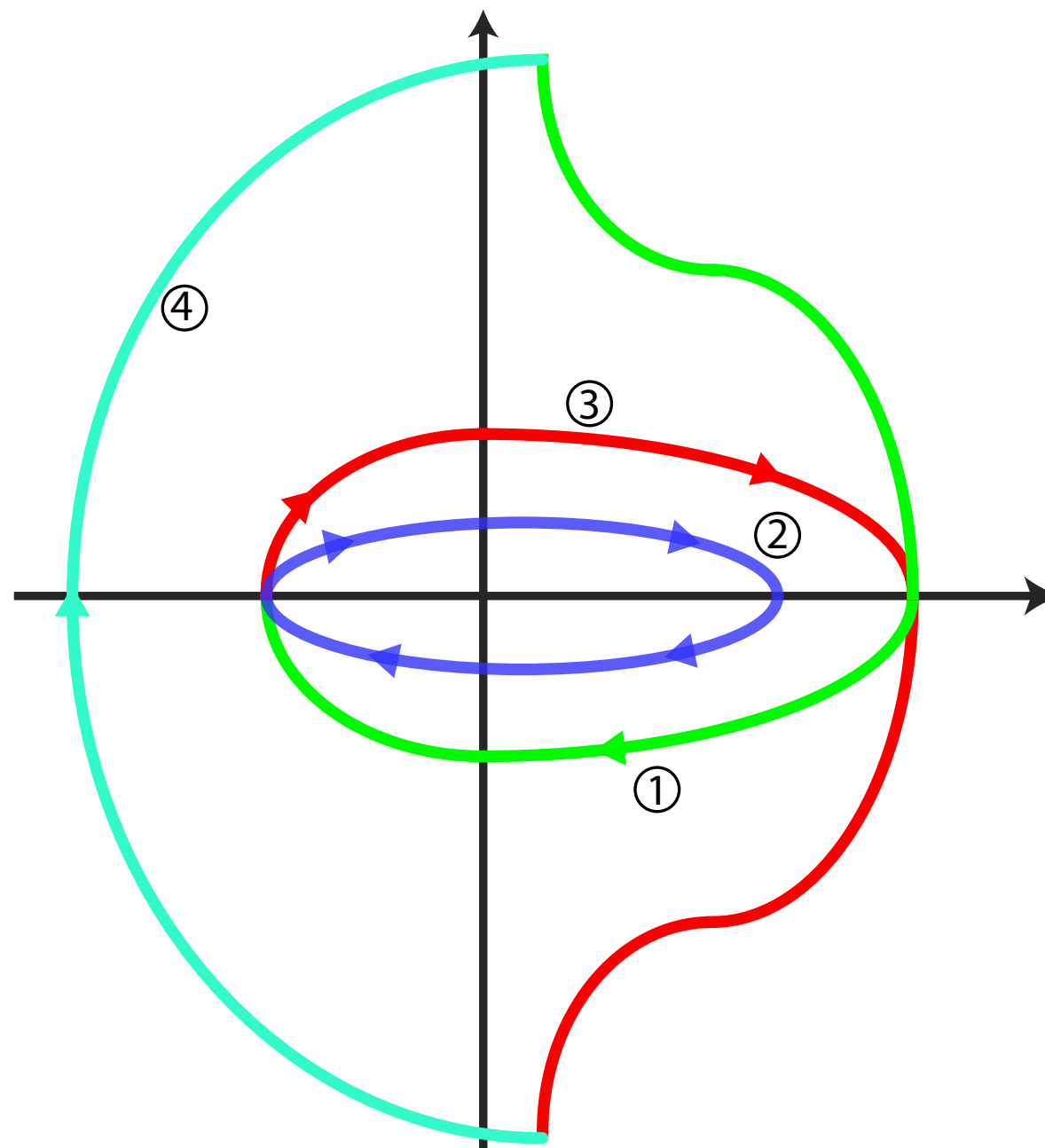
$G(s)$  : pole(s) at origin  
Nyquist Contour

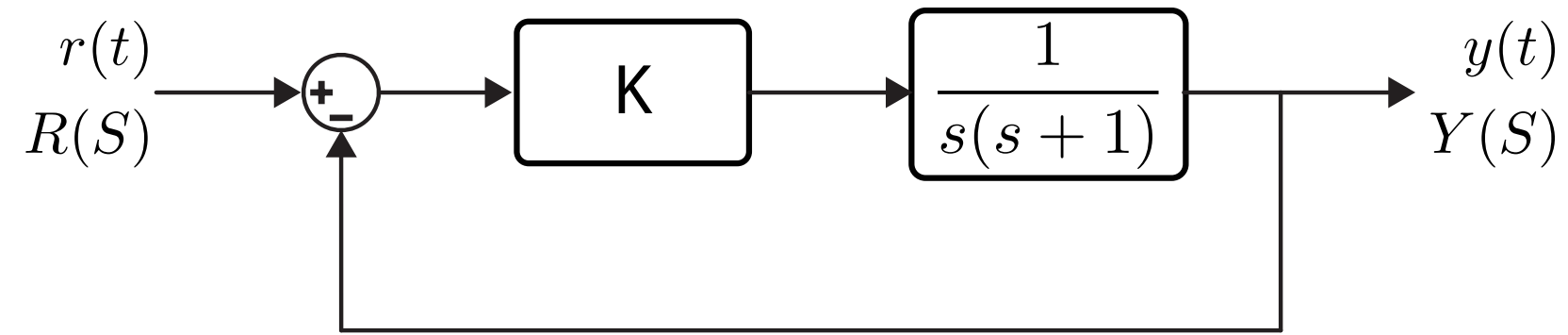


$G(s)$  : pole(s) at origin  
Nyquist Contour



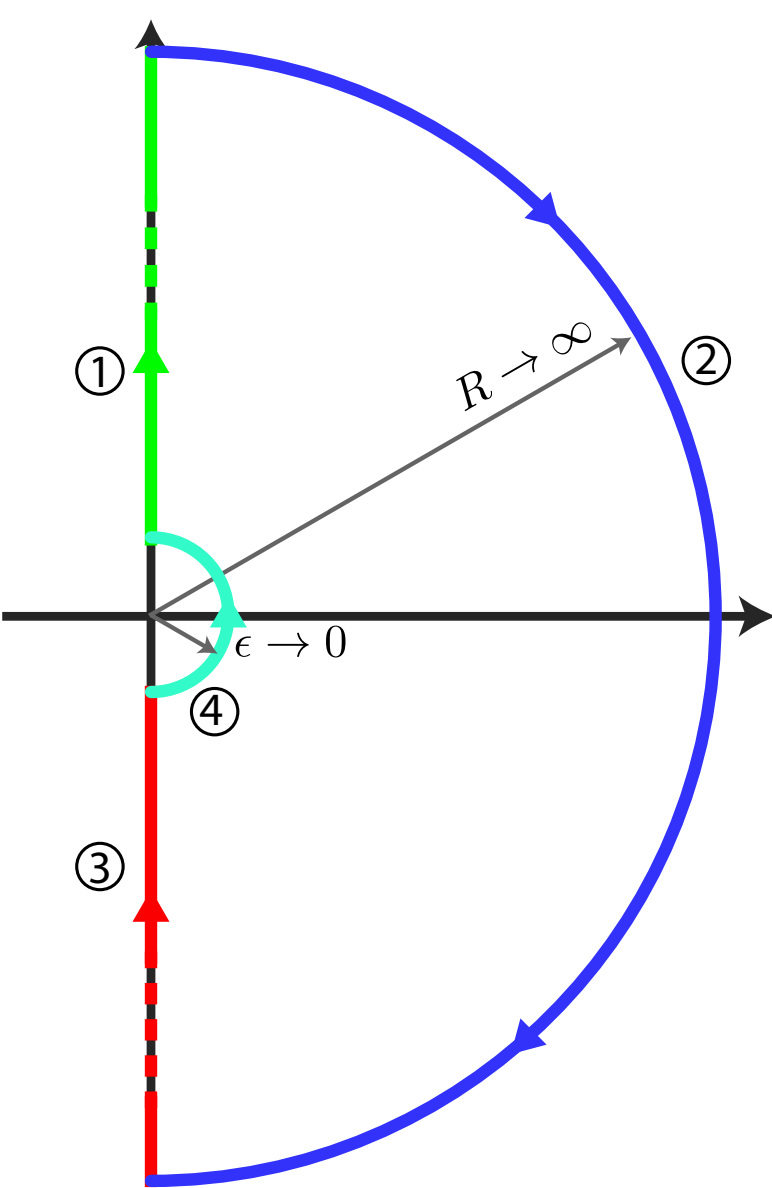
Nyquist Plot



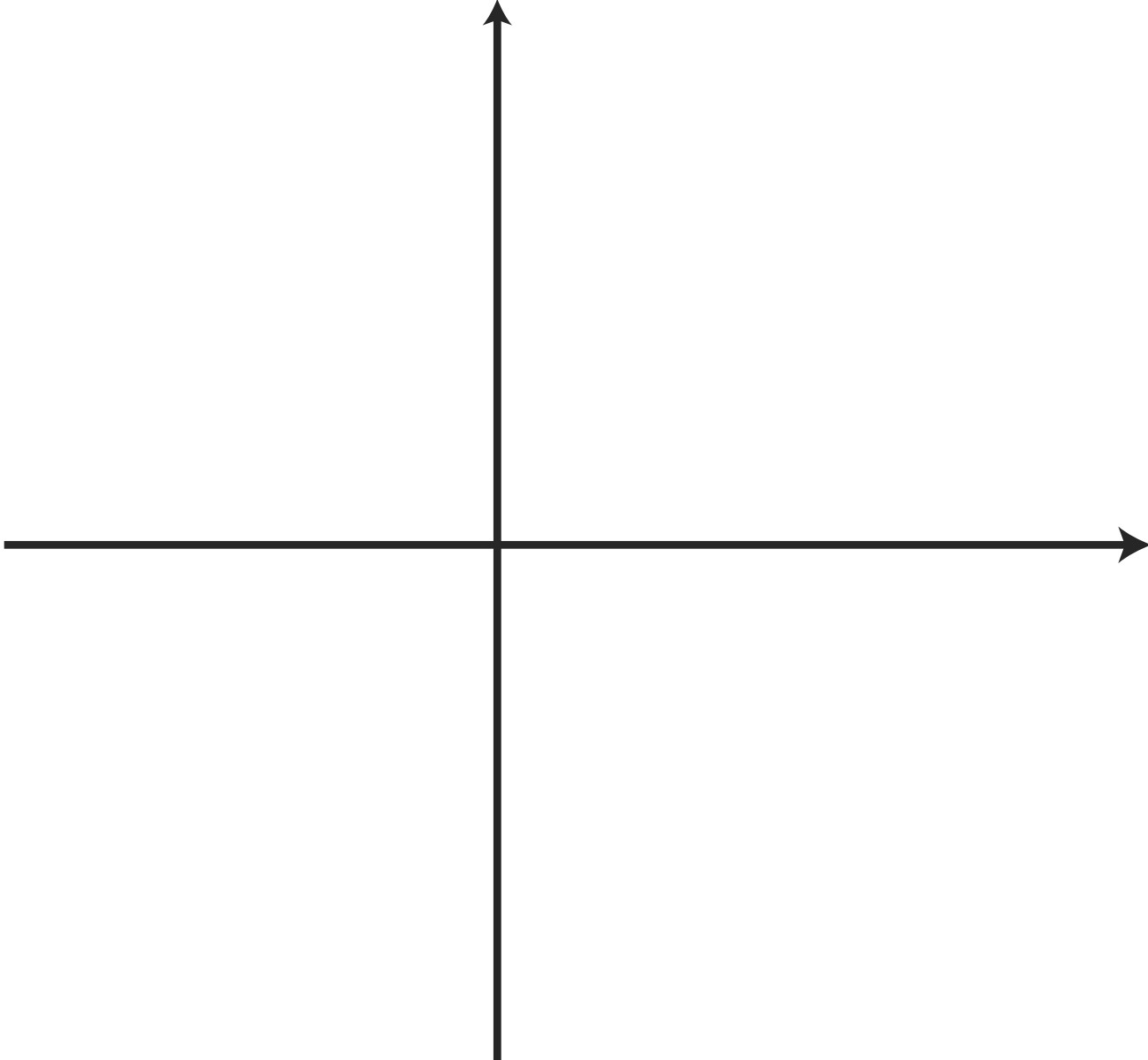


$$G_{OL}(s) = \frac{1}{s(s+1)}$$

Nyquist Contour

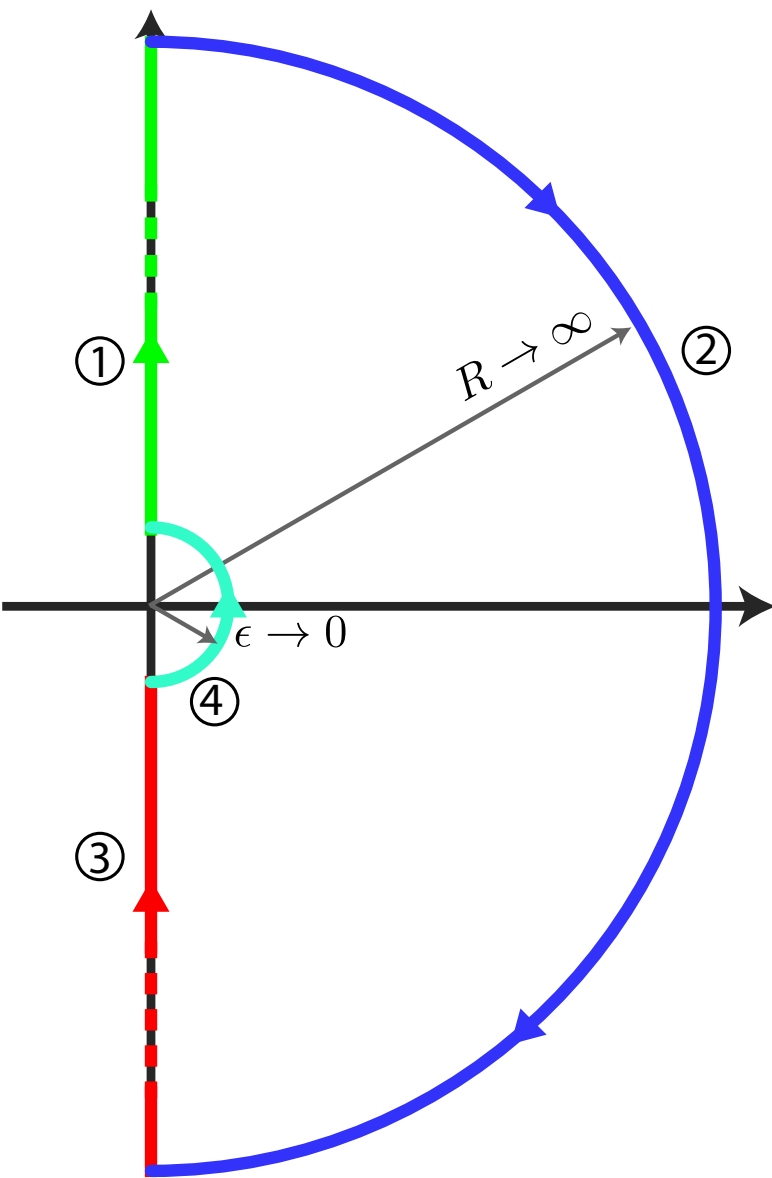


Nyquist Plot

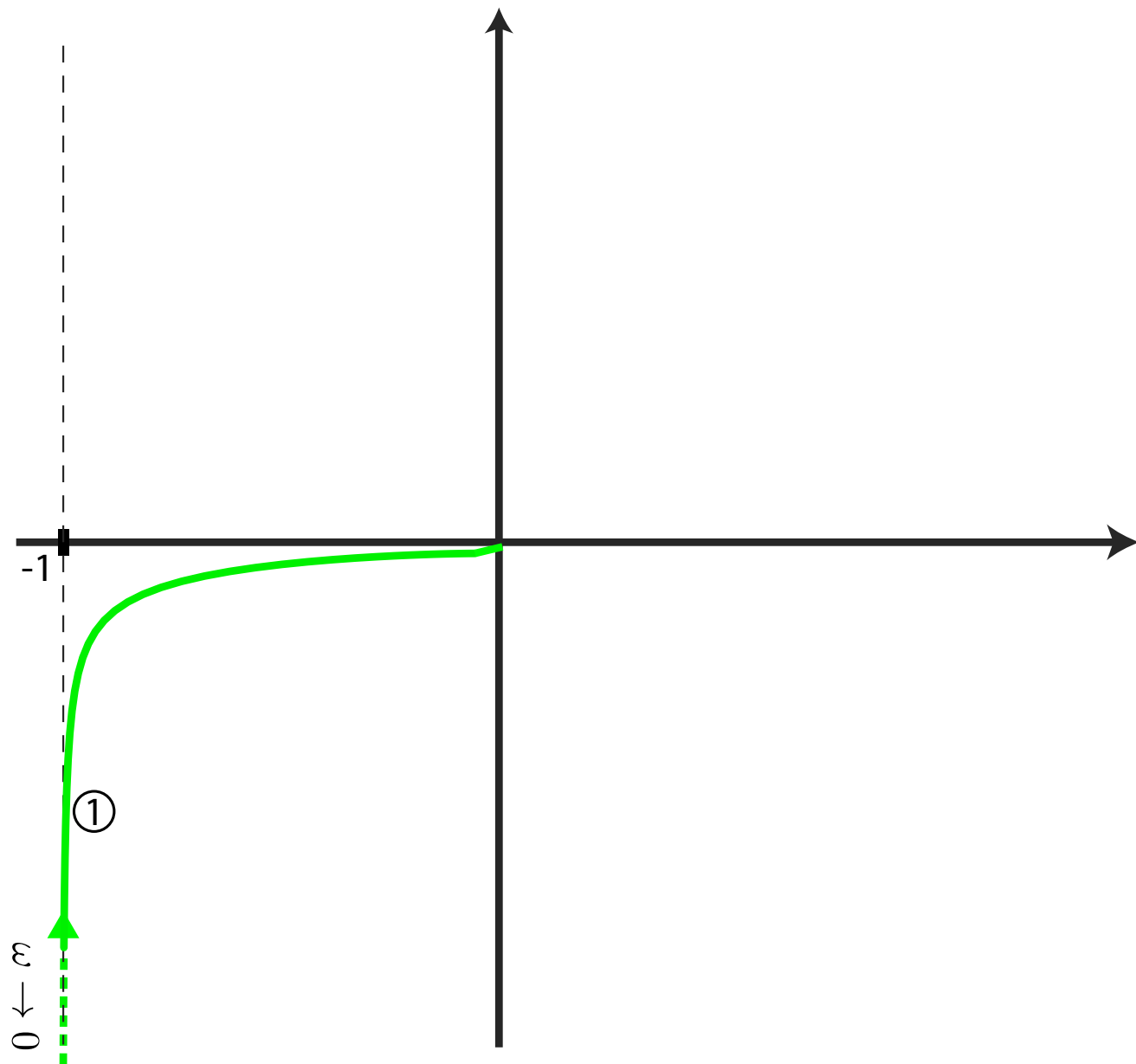


$$G_{OL}(s) = \frac{1}{s(s+1)}$$

Nyquist Contour



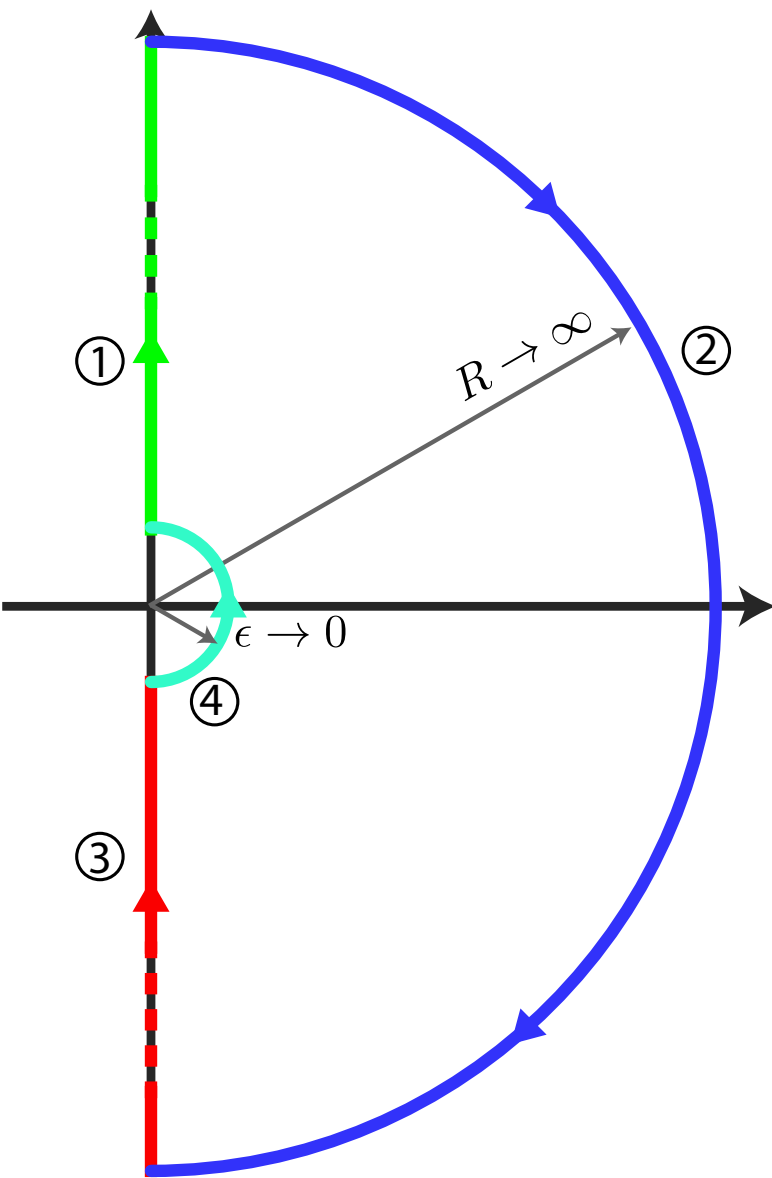
Nyquist Plot



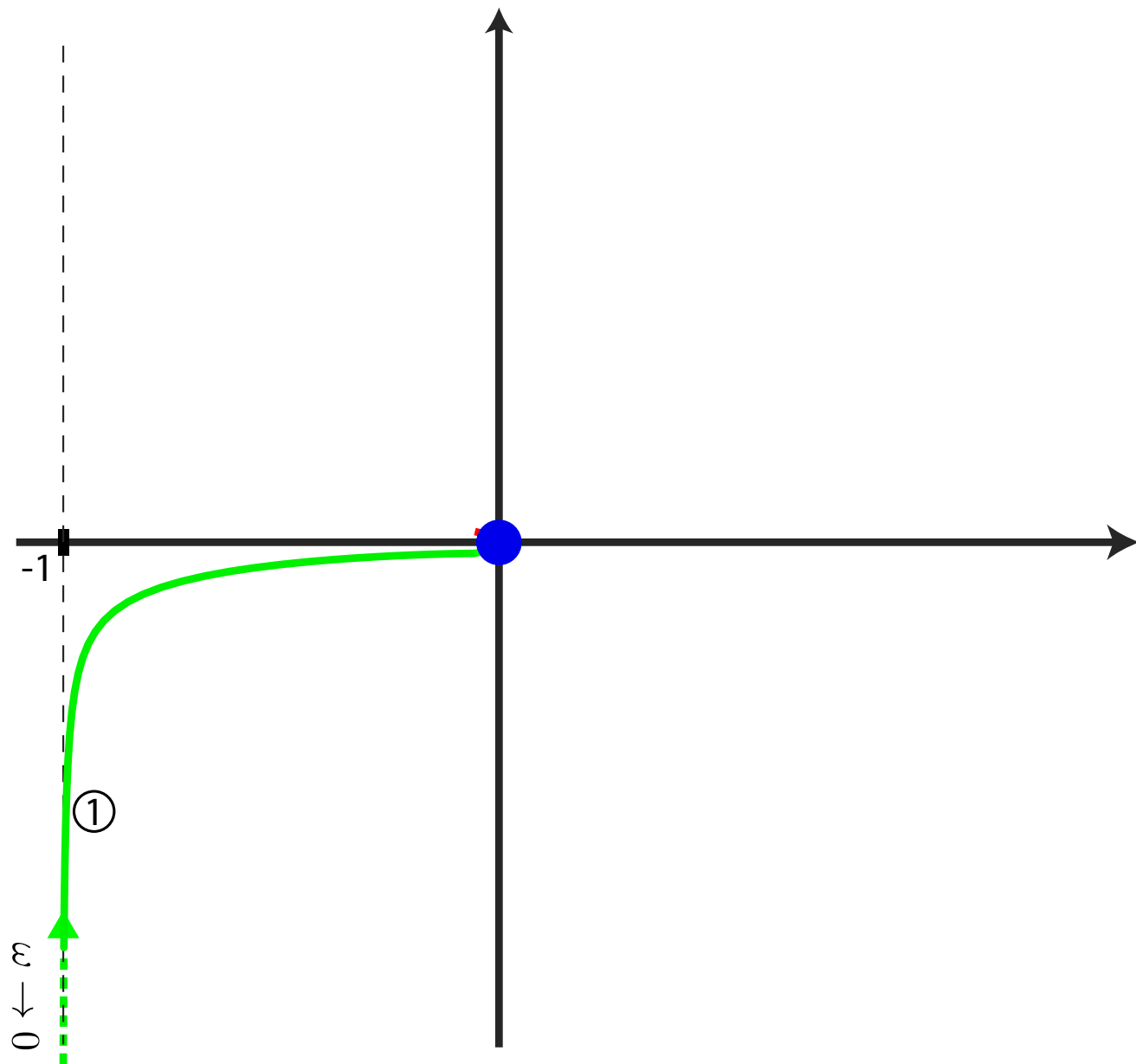


$$G_{OL}(s) = \frac{1}{s(s+1)}$$

Nyquist Contour

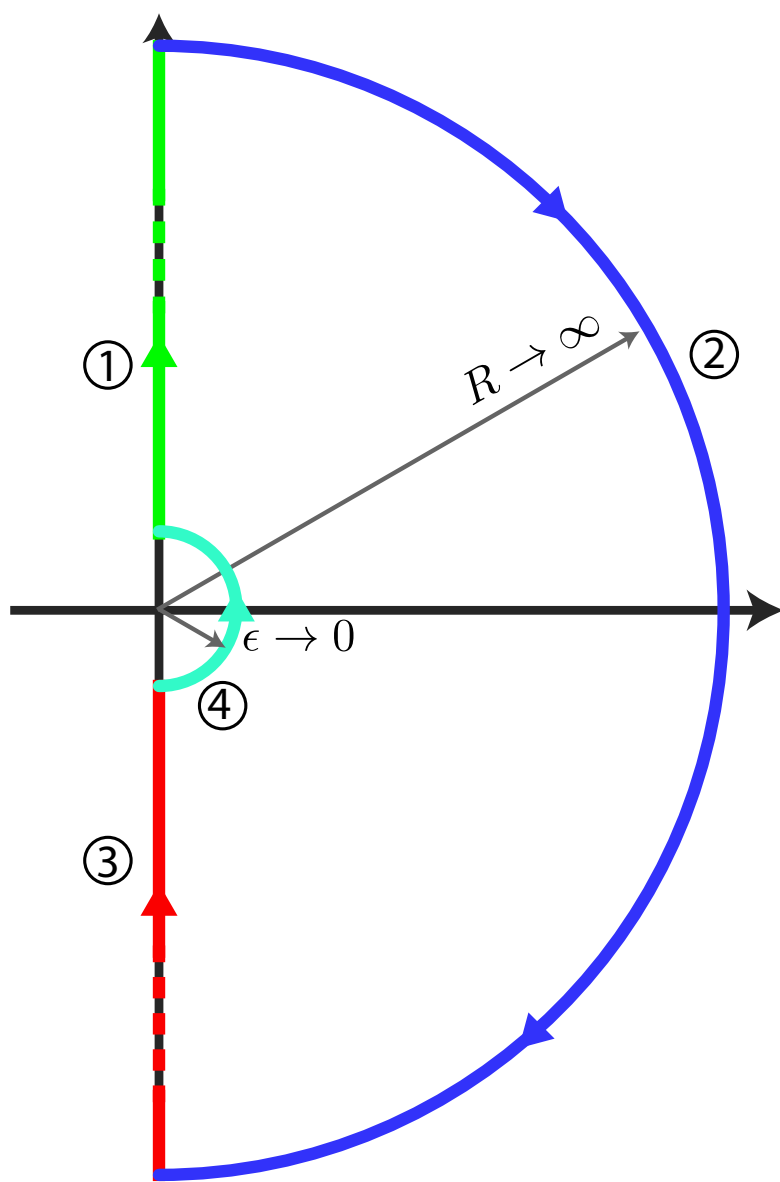


Nyquist Plot

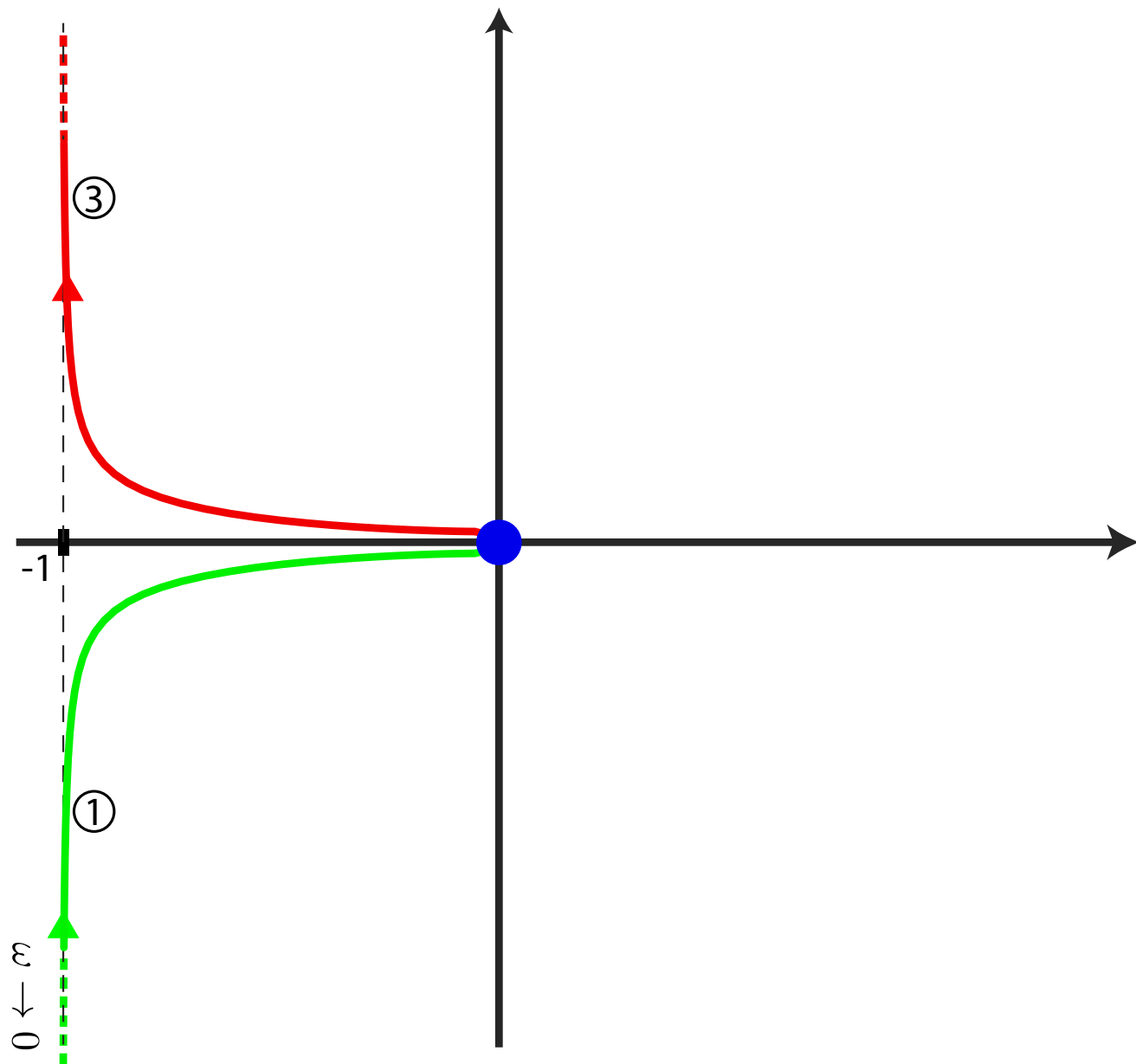


$$G_{OL}(s) = \frac{1}{s(s+1)}$$

Nyquist Contour

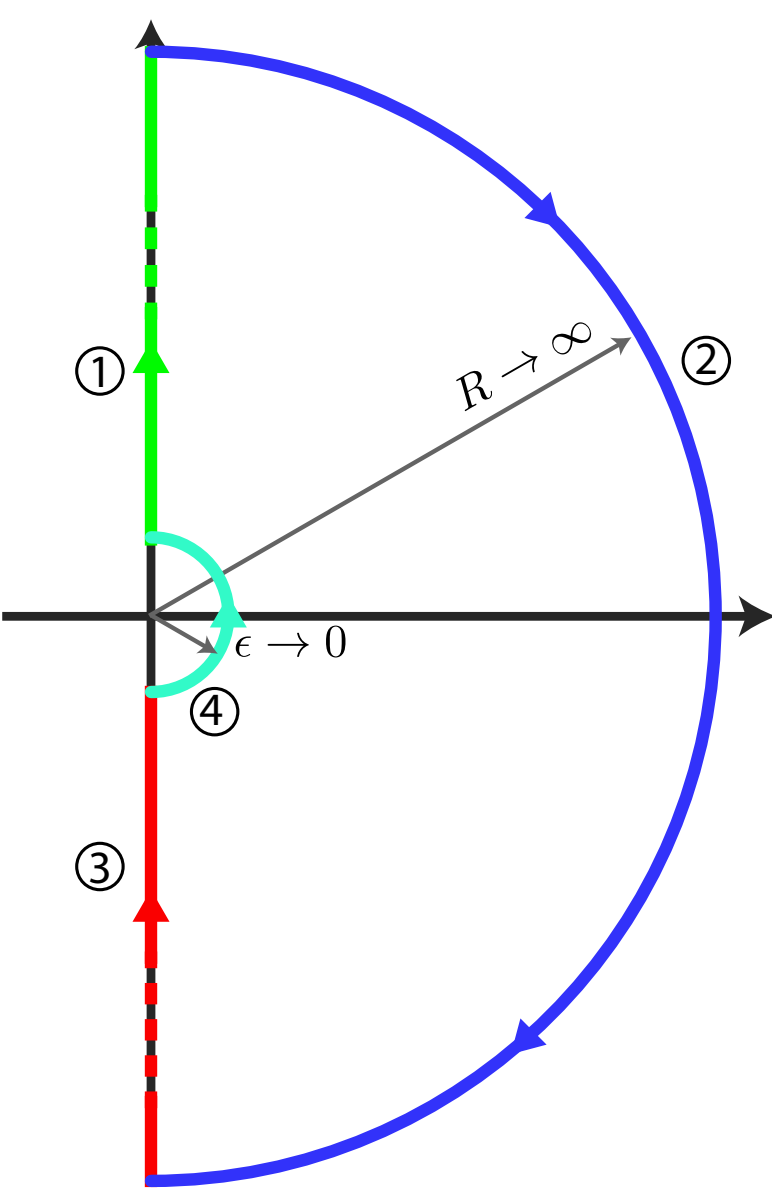


Nyquist Plot

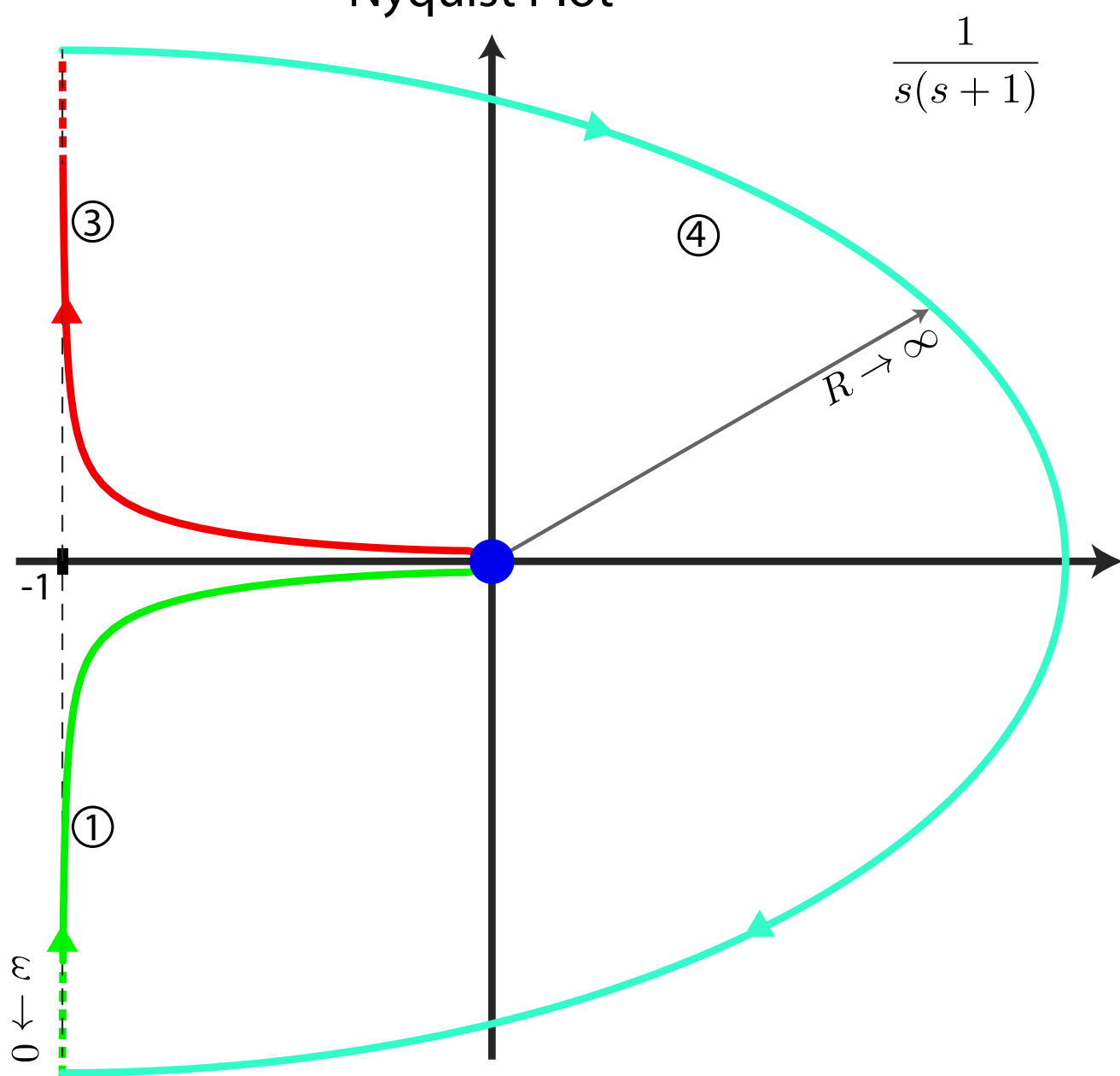


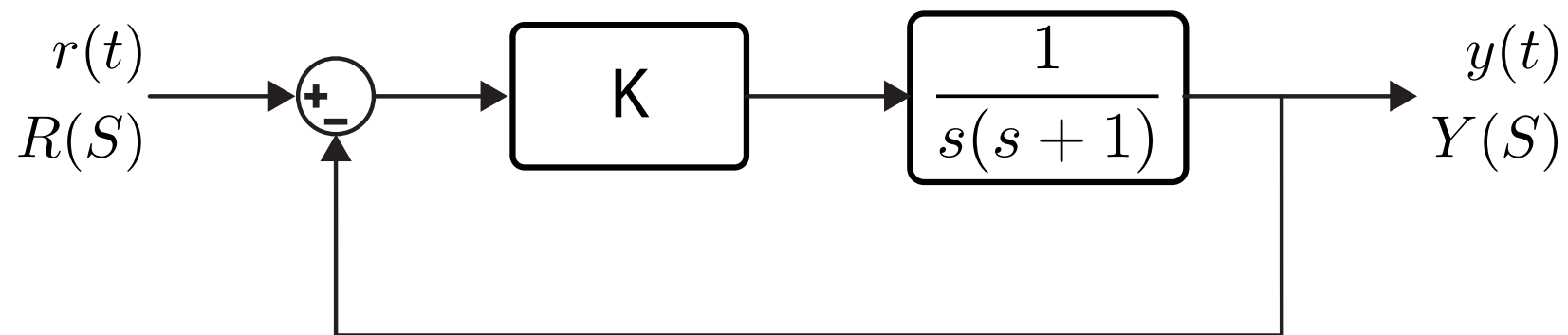
$$G_{OL}(s) = \frac{1}{s(s+1)}$$

Nyquist Contour

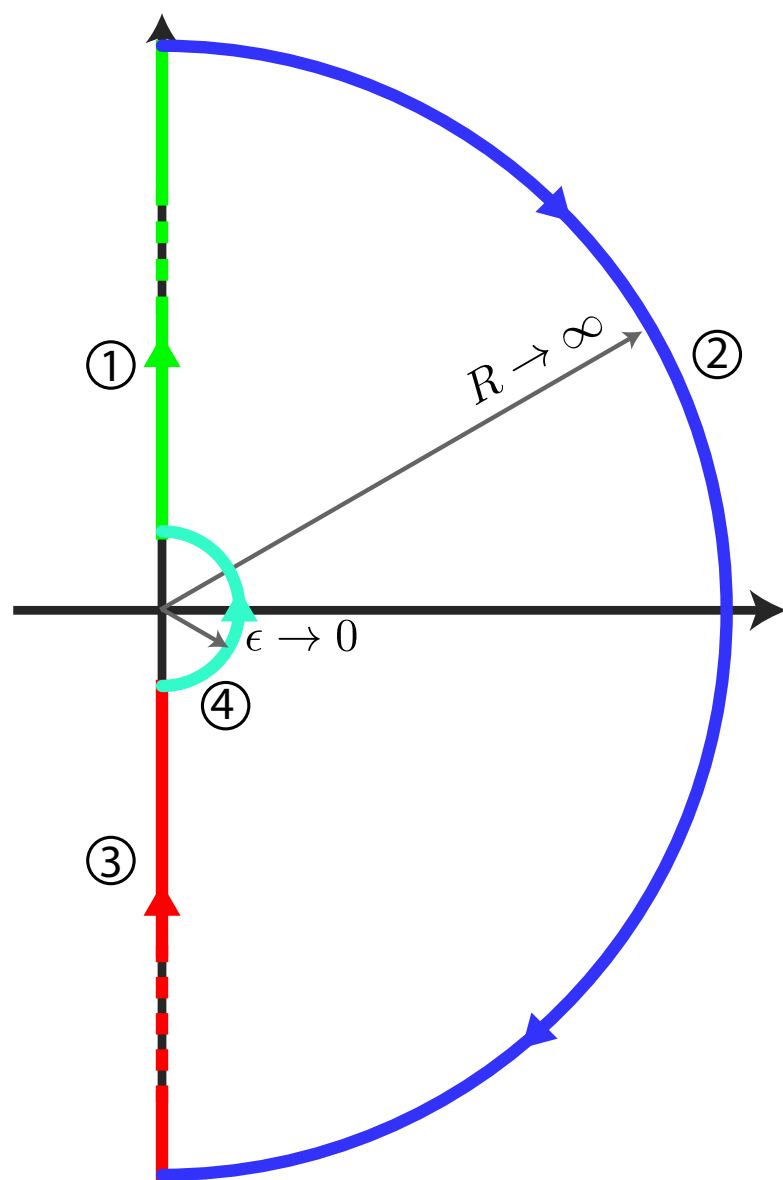


Nyquist Plot





Nyquist Contour



Nyquist Plot

