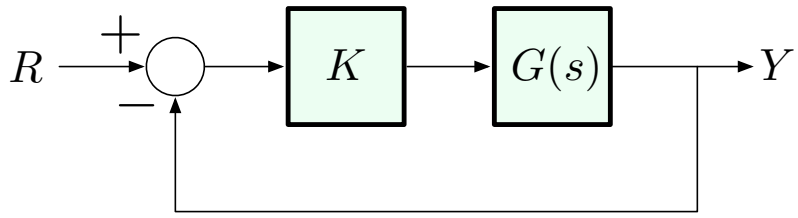
Stability from Frequency Response



Question: How can we decide whether the *closed-loop* system is stable for a given value of $K > 0$ based on our knowledge of the *open-loop* transfer function $KG(s)$?

Another answer: let's look at the Bode plots:

$$\omega \longmapsto |KG(j\omega)| \qquad \text{on log-log scale}$$
$$\omega \longmapsto \angle KG(j\omega) \qquad \text{on log-linear scale}$$

— Bode plots show us magnitude and phase, but only for $s = j\omega$, $0 < \omega < \infty$

How does this relate to the root locus? $j\omega$-crossings!!