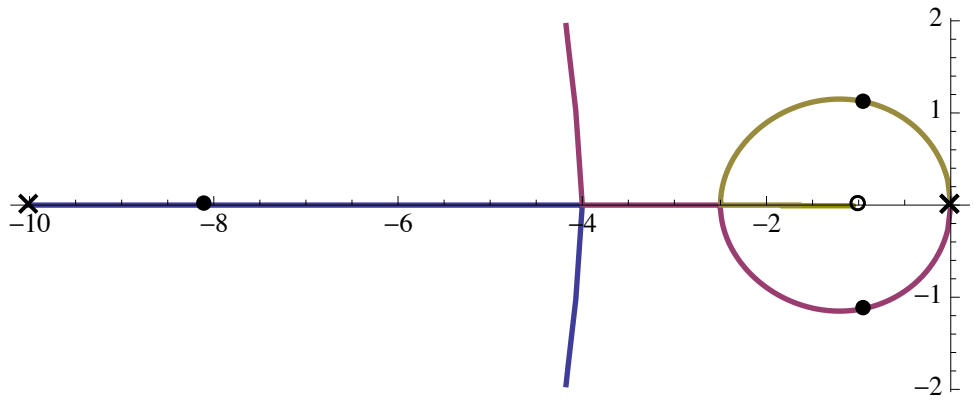
Double Integrator & Lead Compensator

$$L(s) = \frac{s+1}{s^2(s+p)}$$

Root locus for $p = 10$:



The design seems to look good: nice damping, can meet reasonable specs.

Any concerns with large values of p?

When p is large, we are very close to PD control, so we run into the same issue: noise amplification.
(This is just intuition for now — we will confirm it later using frequency-domain methods.)