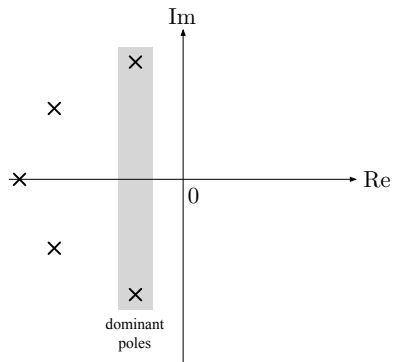


## Effect of Extra Poles

A general  $n$ th-order system has  $n$  poles



- ▶ extra LHP poles are not significant if their real parts are at least  $5\times$  the real parts of dominant LHP poles
- ▶ e.g., if dominant poles have  $\text{Re}(s) = -2$  and we have extra poles with  $\text{Re}(s) = -10$ , their time-domain contributions will be  $e^{-2t}$  and  $e^{-10t} \ll e^{-2t}$
- ▶  $5\times$  is just a convention, but we can really see the effect of extra poles that are closer (cf. Lab 2)