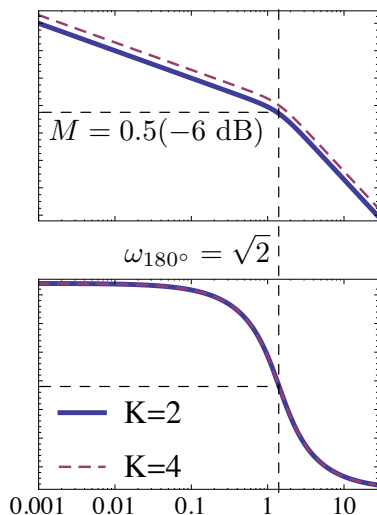


Gain Margin

Our example: $G(s) = \frac{1}{s(s^2 + 2s + 2)}$, $K = 2$ (stable)



Gain margin (GM) is the factor by which K can be multiplied before we get $M = 1$ when $\phi = 180^\circ$

Since varying K doesn't change ω_{180° , to find GM we need to inspect M at $\omega = \omega_{180^\circ}$

In this example:

$$\begin{aligned} \text{at } \omega_{180^\circ} &= \sqrt{2} \\ M &= 0.5 \text{ (-6 dB),} \\ \text{so GM} &= 2 \end{aligned}$$