

Example 1: Magnitude

Transfer function in Bode form:

$$KG(j\omega) = \frac{2}{j\omega} \cdot \left(\frac{j\omega}{0.5} + 1 \right) \cdot \frac{1}{\left(\frac{j\omega}{10} + 1 \right) \left(\frac{j\omega}{50} + 1 \right)}$$

Type 1 term:

- ▶ $K_0 = 2, n = -1$ — it contributes a line of slope -1 passing through the point $(\omega = 1, M = 2)$.
- ▶ This is a **low-frequency asymptote**: for small ω , it gives very large values of M , while other terms for small ω are close to $M = 1$ (since $\log 1 = 0$).

Now we mark the break-points, from Type 2 terms:

- ▶ $\omega = 0.5$ stable zero \Rightarrow slope steps up by 1
- ▶ $\omega = 10$ stable pole \Rightarrow slope steps down by 1
- ▶ $\omega = 50$ stable pole \Rightarrow slope steps down by 1