# ROB311 Quiz 2

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# 1 Bode Plots

## 1.1 Bode Plots

**Process:**

### 1.1.1 Constant Gain

### 1.1.2 Pole or Zero at $\omega = 0$

### 1.1.3 Non-Zero Pole or Zero

### 1.1.4 Complex Conjugate Poles

## 1.2 Robustness Margins

**Motivation:** Approximate the GM and PM from the Bode plot:

- $L(s)$ is a strictly proper rational fn.
- $L(s)$ has no poles in $\mathbb{C}^+$ (no open loop variable poles)

### 1.2.1 Gain Margin

**Definition:**

$$|L(j\omega_{gc}) = 1| \iff |L(j\omega_{gc})|_{dB} = 0$$

### 1.2.2 Phase Margin

**Definition:**

$$|L(j\omega_{gc})| = 1 \implies |L(j\omega_{gc})|_{dB} = 0$$

# 2 Robustness Margins

# 3 Root Locus, Bode, and Nyquist