

- control design lead-lag / PID to achieve: PM, GM, ω_c , SS error

- Design for phase margin:

- lead or PD

- Select crossover (cont out $\approx 0^\circ$)

- calc. req'd ϕ

- design lead / PD:

- evaluate lead pole / zero or PD zero

- evaluate gain to set ω_c

- Design for gain margin (if necessary)

- reduce ω_c

- reduce high-freq. gain (low-pass, notch)

- Design for ESS

- increase low-freq. gain w/ lag

- set lag ratio of design

- Add integral to zero out

- set lag / PI zero below ω_c

to avoid phase loss while keeping zero large

→ Decide:

- proportional

- PD or lead

- PI or lag

- lead-lag, PID

- lead-PI, PD-lag