Helicopter Lab

2.2 Pitch PD-controller - Pole placement

Two poles, same place - critically stable
Two poles, real axes - overdempet
Two complex conjugate poles - underdempet

Trial	lambda_1	lambda_2	Stability theory	Stability observed
1	-2, 0	-2, 0	Critically stable	Kinda good
2	-4, 0	-4, 0	Critically stable	Underdempet
3	-0.7, 0	-0.7, 0	Critically stable	Overdempet
4	-0.5, 0	-2, 0	Overdempet	Overdempet
5	-8, 0	-2, 0	Overdempet	Underdempet
6	0, 1	0, -1	Underdempet	Marginally stable
7	-2, 1	-2, 1	Underdempet	Underdempet
8	-2, 8	-2, -8	Underdempet	Unstable

2.3 Pitch PD-controller - Harmonic Oscillator

zeta < 1 : underdempet
zeta = 1 : critical
zeta > 1 : overdempet

zeta = sin(phi) = angle of the poles (starting from y axis)
w_0 : angular frequency = length of the poles from origin

Trial	zeta	w_0	Stability theory	Stability observed
1	1	0.5	Critically stable	overdempet
2	1	1	Crit	overdempet
3	1	1.5	Crit	kinda good
4	1	4	Crit	underdempet
5	3	1.5	Over	under, then over

6	3	6	Over	marginally stable
7	0.5	0.5	Under	over
8	0.5	1.5	Under	really good

LQR

Trial	q_p	q_pdot	q_edot	r_p	r_edot
1					