MPC: Quadcopter unconstrained

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Institute of Automation and Control

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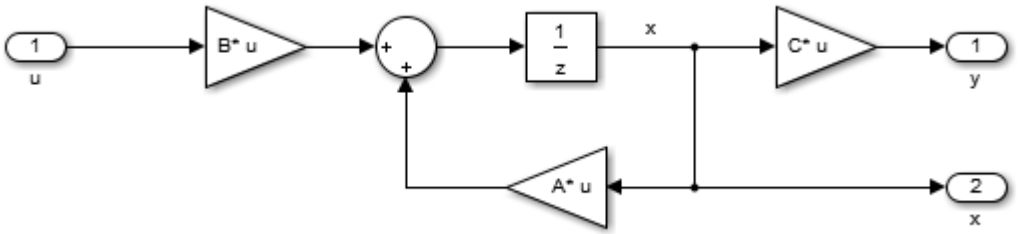
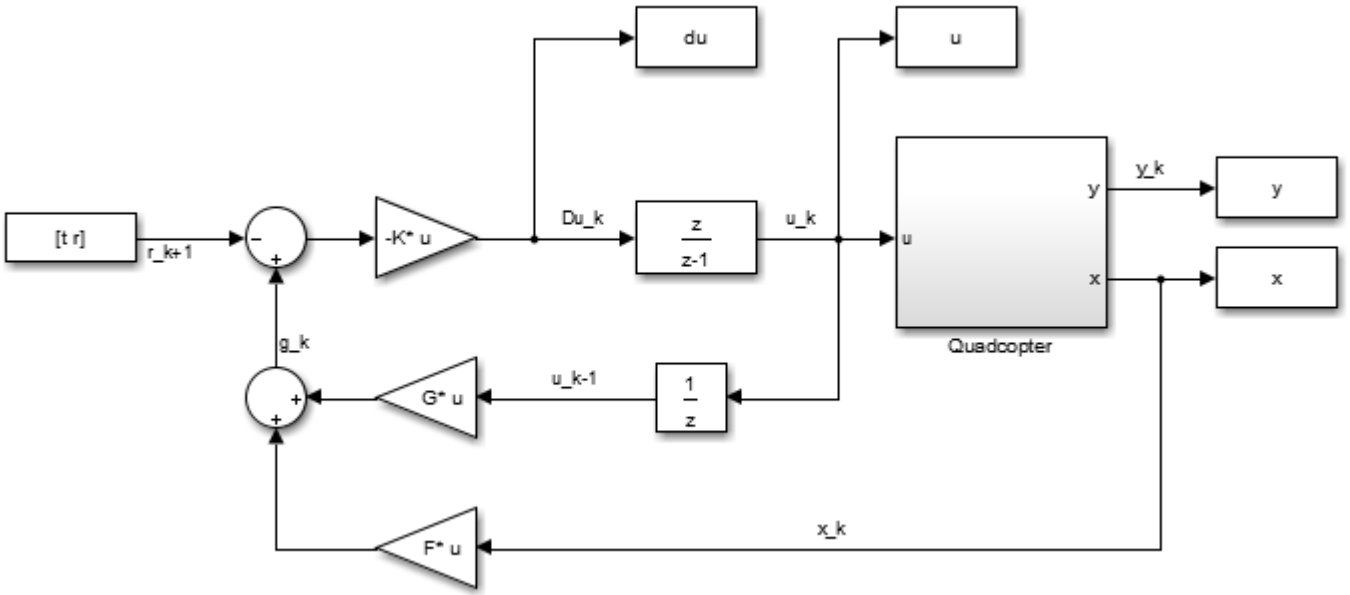
Simulink

Quadcopter Modell

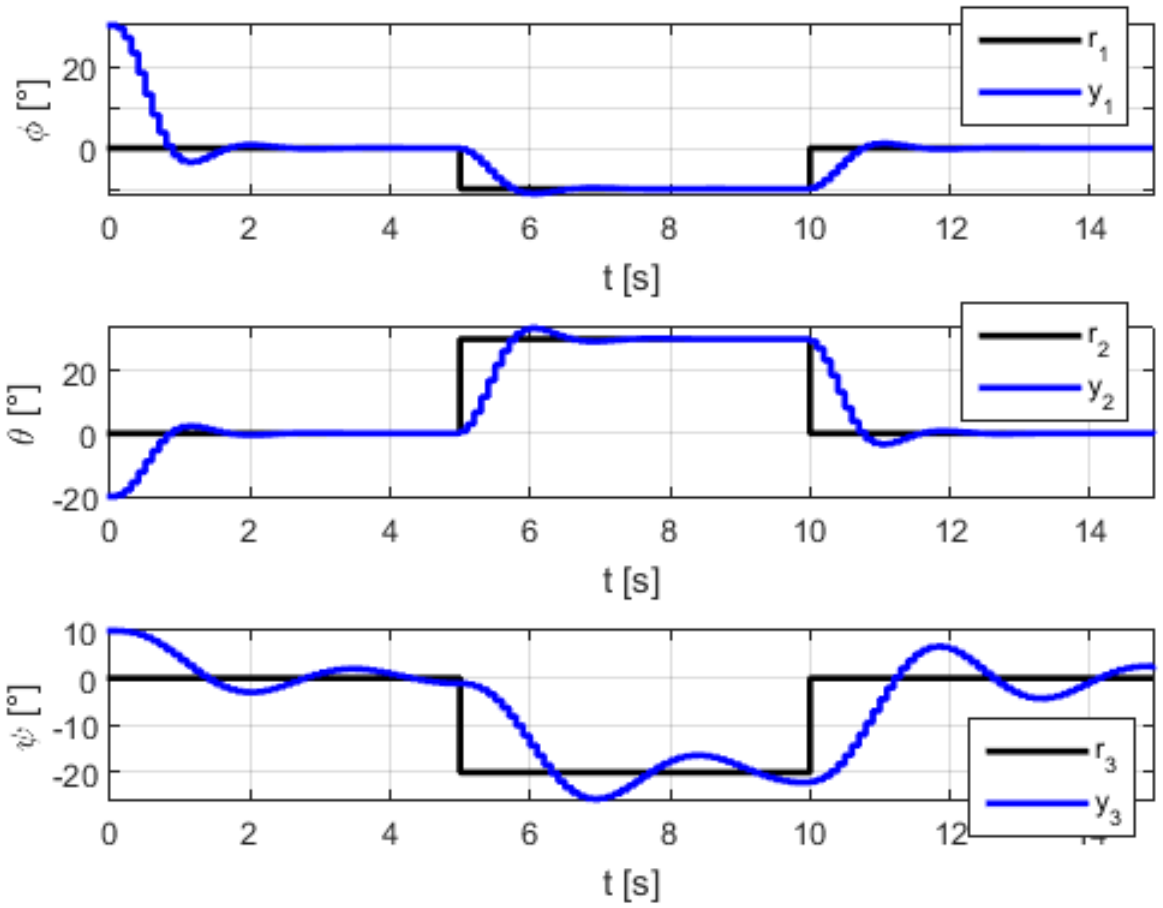


Feedback loop

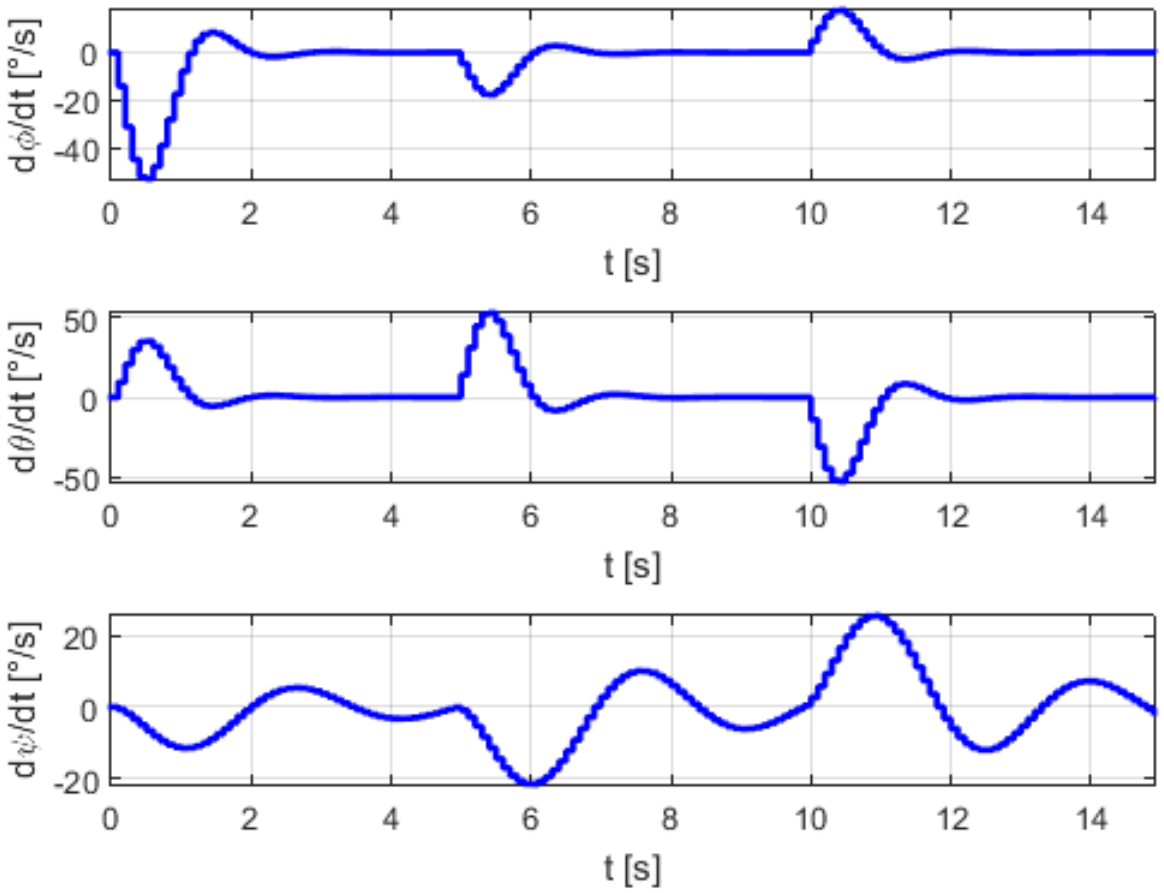


Nominal case

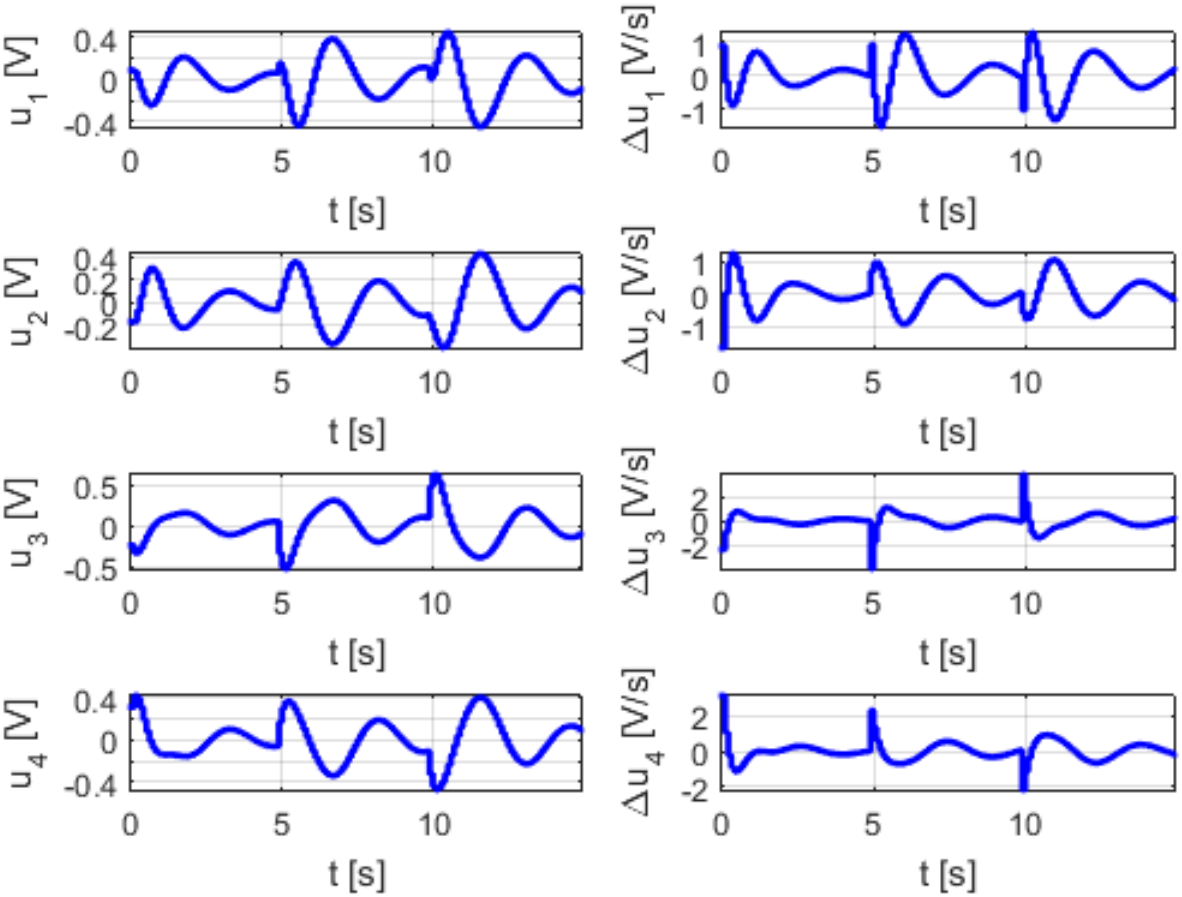
N_P=10, N_C=5, Q_i=E, R_i=E



N_P=10, N_C=5, Q_i=E, R_i=E

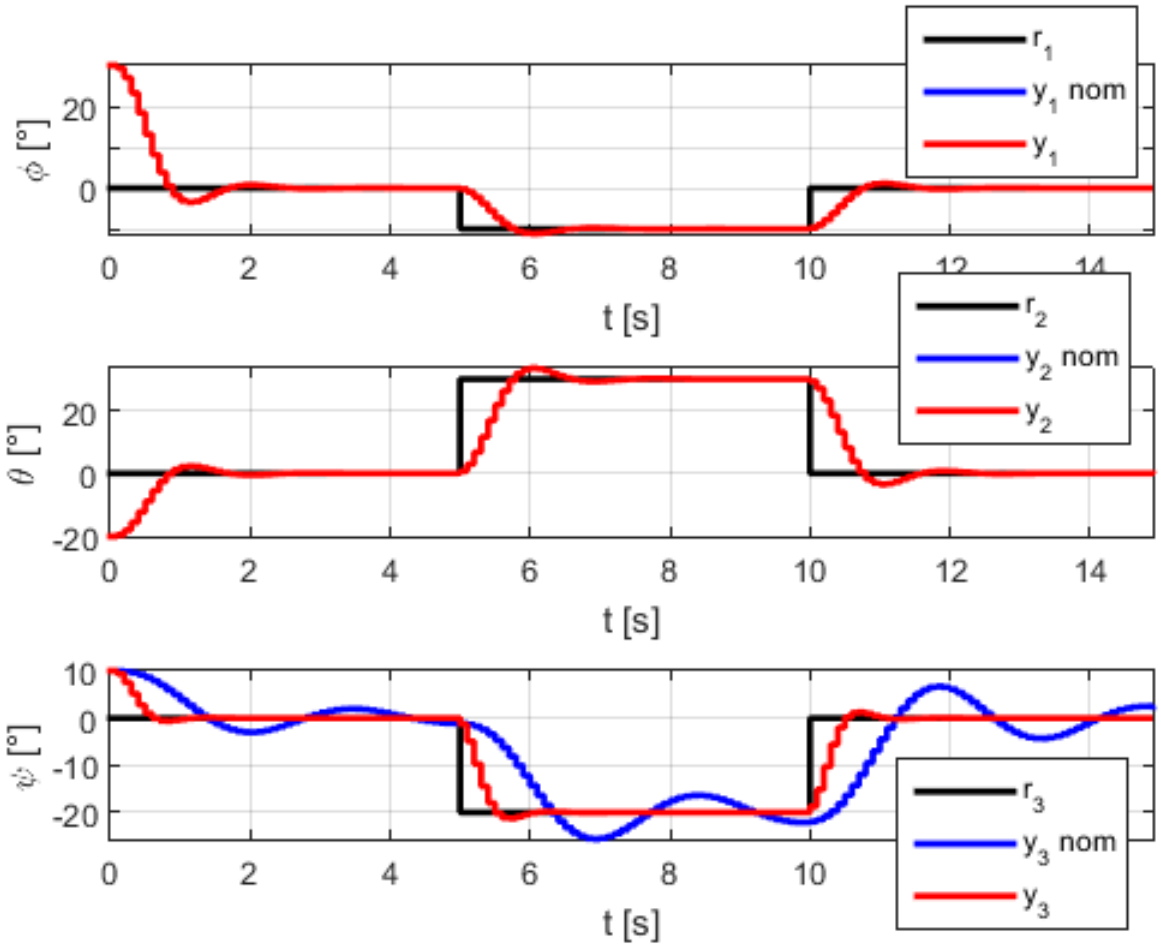


N_P=10, N_C=5, Q_i=E, R_i=E

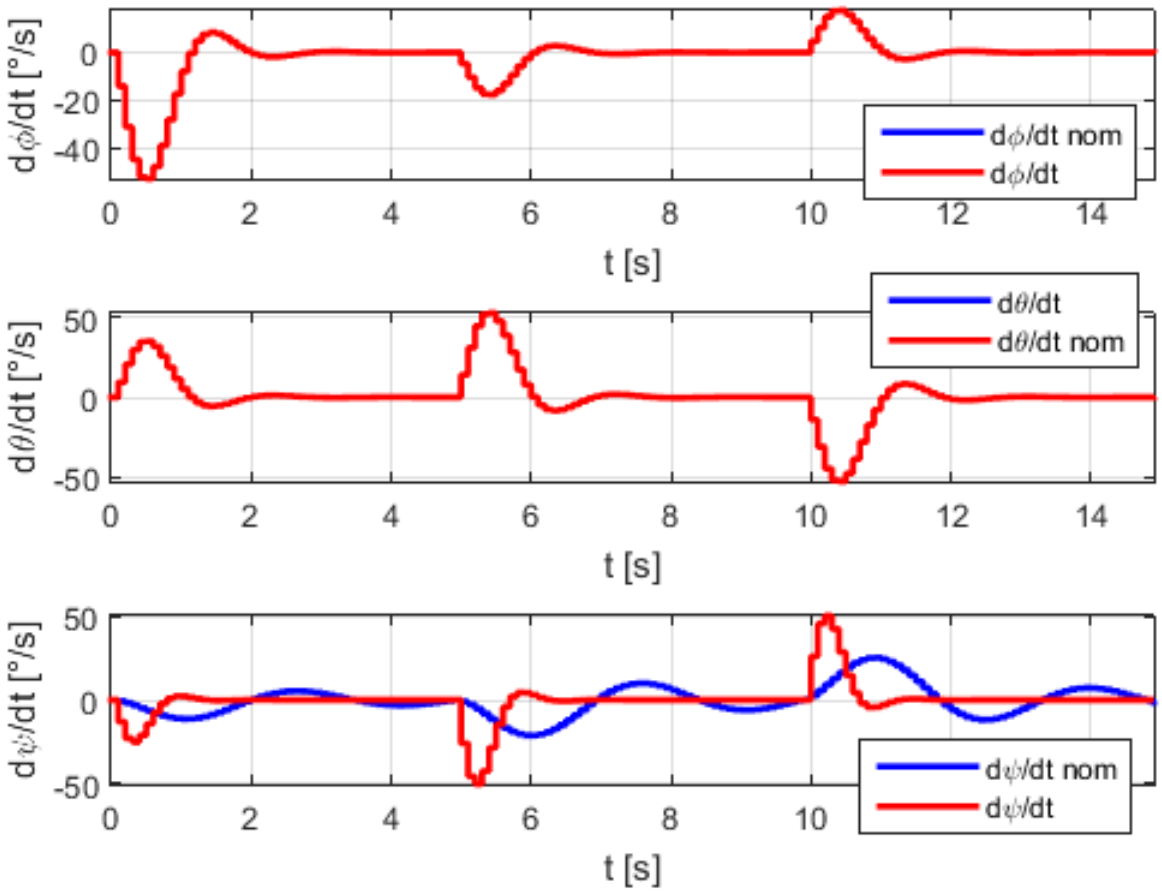


Variation of Q and R

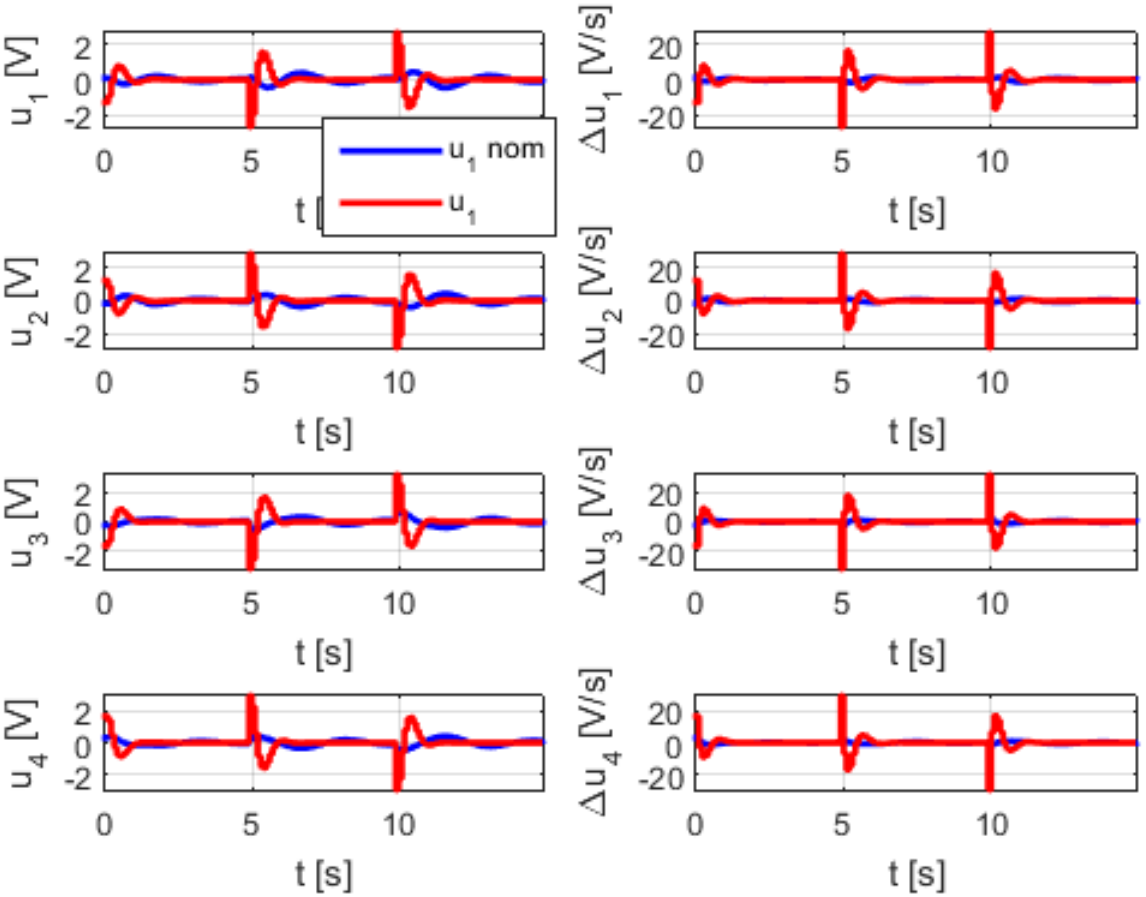
Q_i=diag([1 1 1000]), R_i=diag([1 1 1])



Q_i=diag([1 1 1000]), R_i=diag([1 1 1])

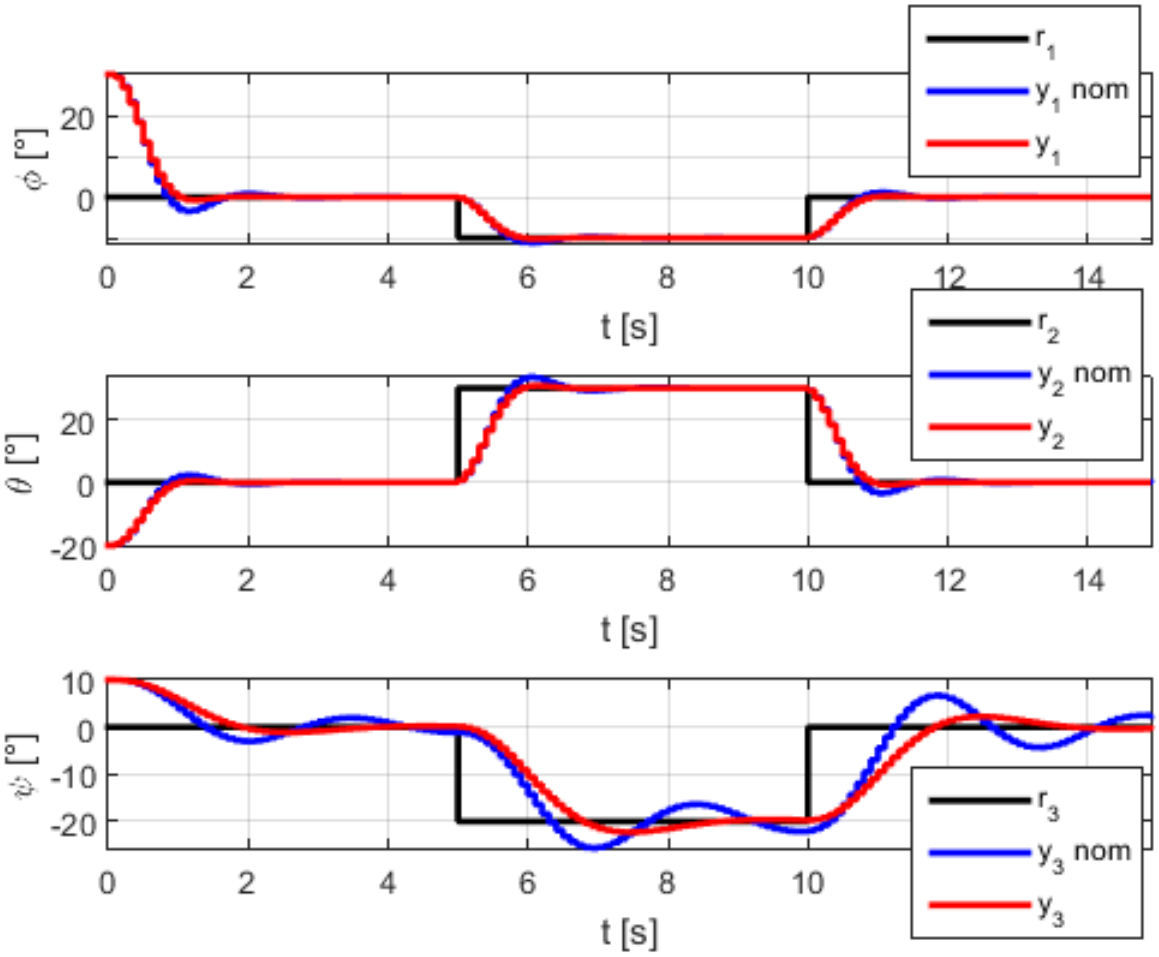


Q_i=diag([1 1 1000]), R_i=diag([1 1 1])

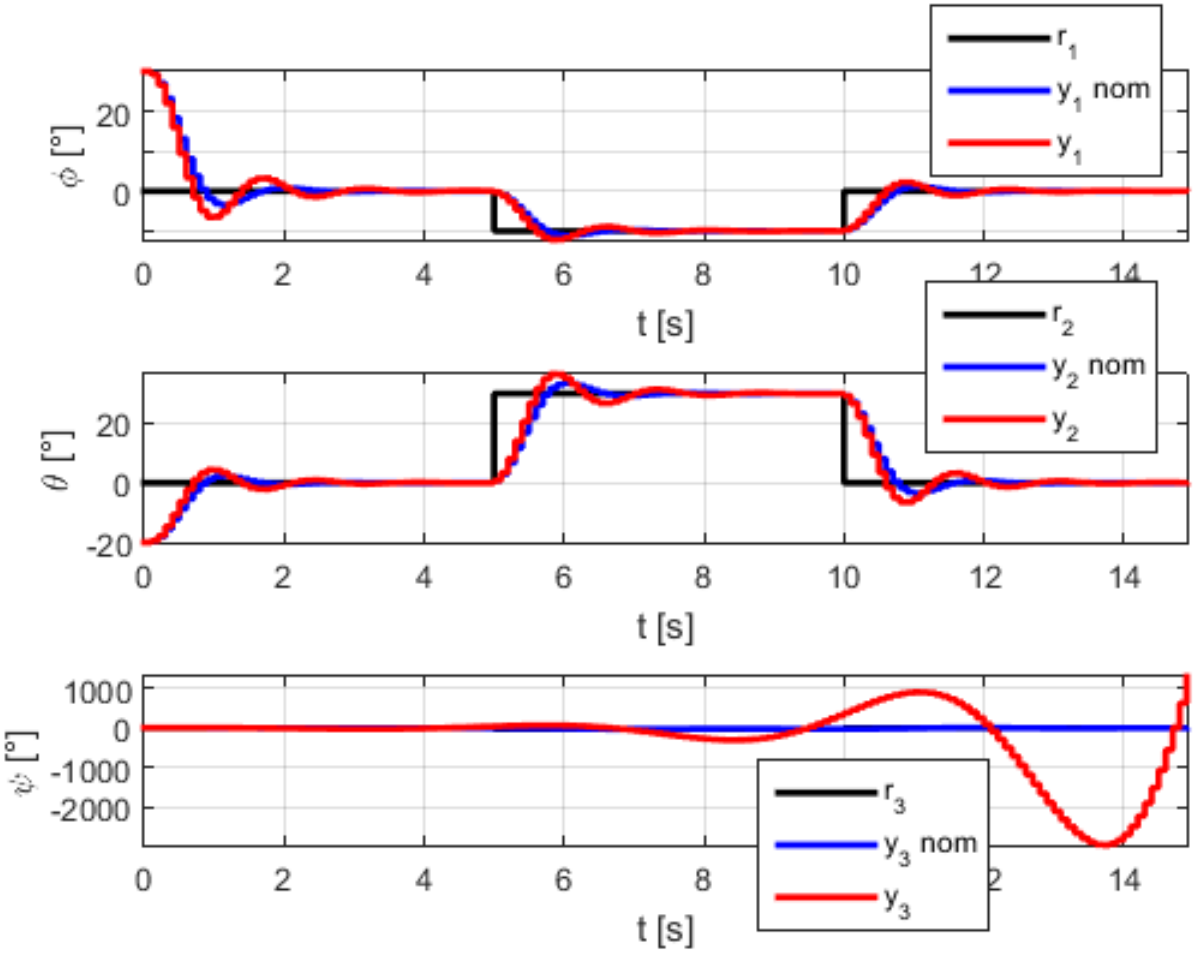


Variation of N_P and N_C

N_P=15, N_C=5

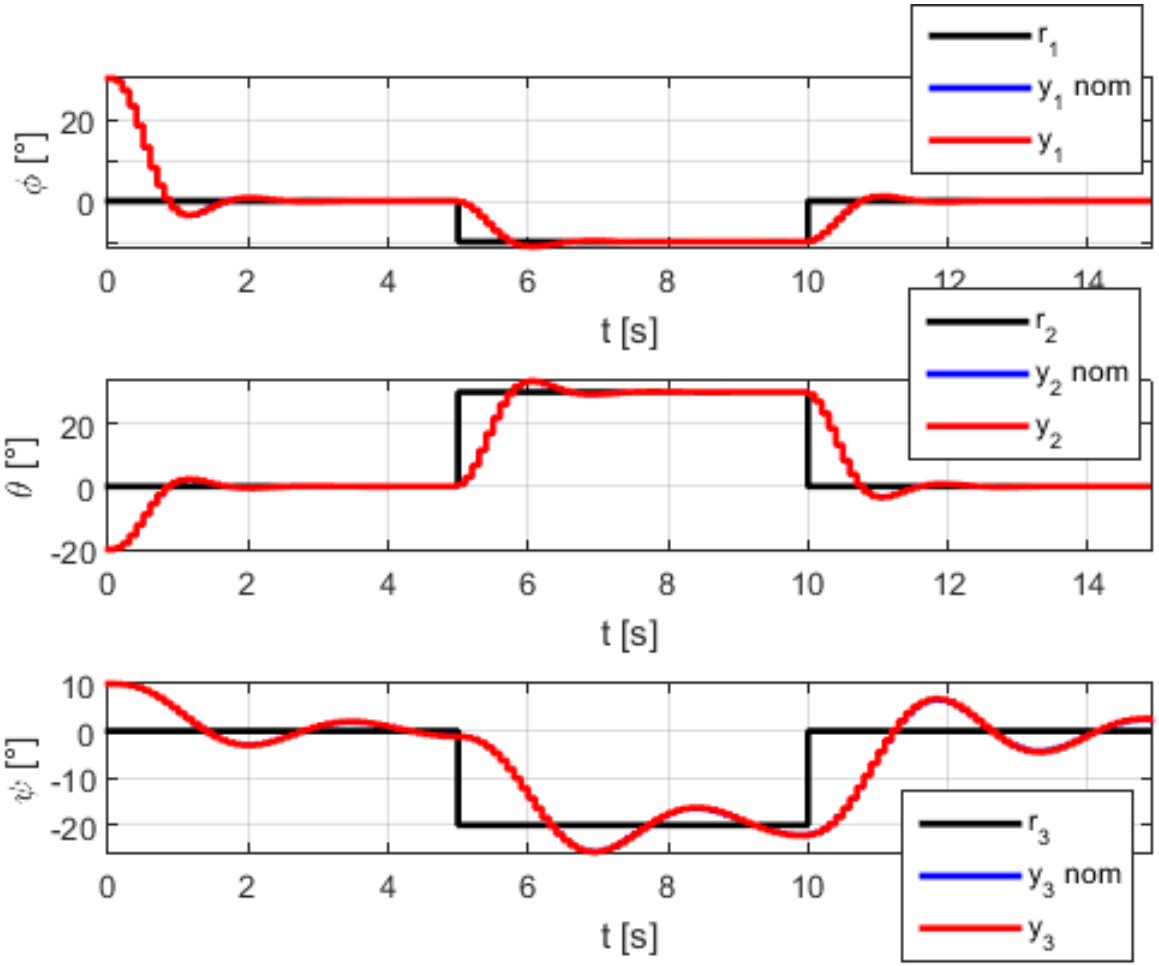

r1
y1 nom
y1
φ [°]
20
0
0
2
4
6
8
10
12
14
t [s]
r2
y2 nom
y2
θ [°]
20
0
-20
0
2
4
6
8
10
12
14
t [s]
10
0
-10
-20
ψ [°]
r3
y3 nom
y3
0
2
4
6
8
10
t [s]

N_P=5, N_C=5

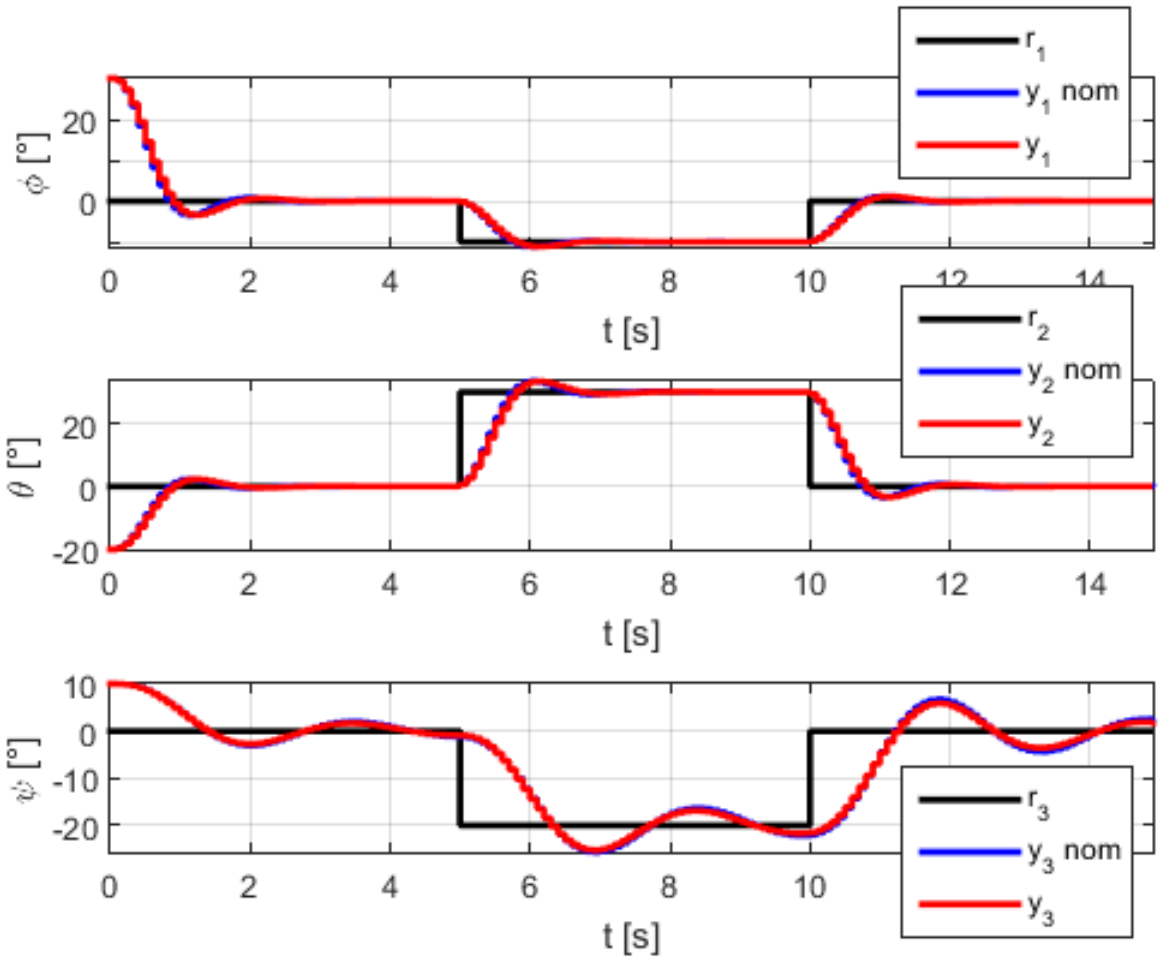


Stability ?!?

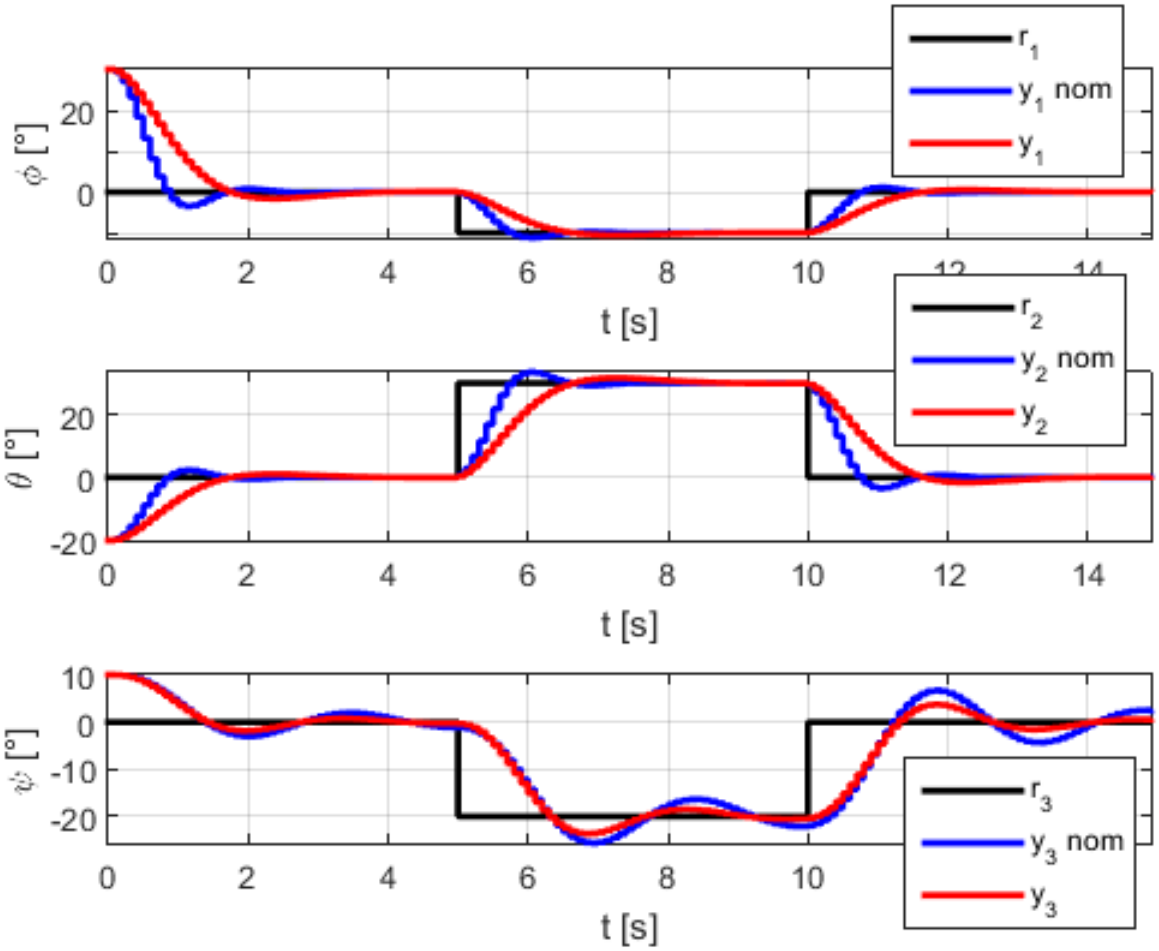
N_P=10, N_C=10


r1
y1 nom
y1
20
0
ϕ [°]
0
2
4
6
8
10
12
14
t [s]
r2
y2 nom
y2
20
0
-20
θ [°]
0
2
4
6
8
10
12
14
t [s]
10
0
-10
-20
ψ [°]
r3
y3 nom
y3
0
2
4
6
8
10
t [s]

N_P=10, N_C=3


r1
y1 nom
y1
20
0
ϕ [°]
0
2
4
6
8
10
12
14
t [s]
r2
y2 nom
y2
20
0
-20
θ [°]
0
2
4
6
8
10
12
14
t [s]
10
0
-10
-20
ψ [°]
r3
y3 nom
y3
0
2
4
6
8
10
t [s]

N_P=10, N_C=1


r1
y1 nom
y1
φ [°]
20
0
0
2
4
6
8
10
12
14
t [s]
r2
y2 nom
y2
θ [°]
20
0
-20
0
2
4
6
8
10
12
14
t [s]
10
0
-10
-20
ψ [°]
r3
y3 nom
y3
0
2
4
6
8
10
t [s]