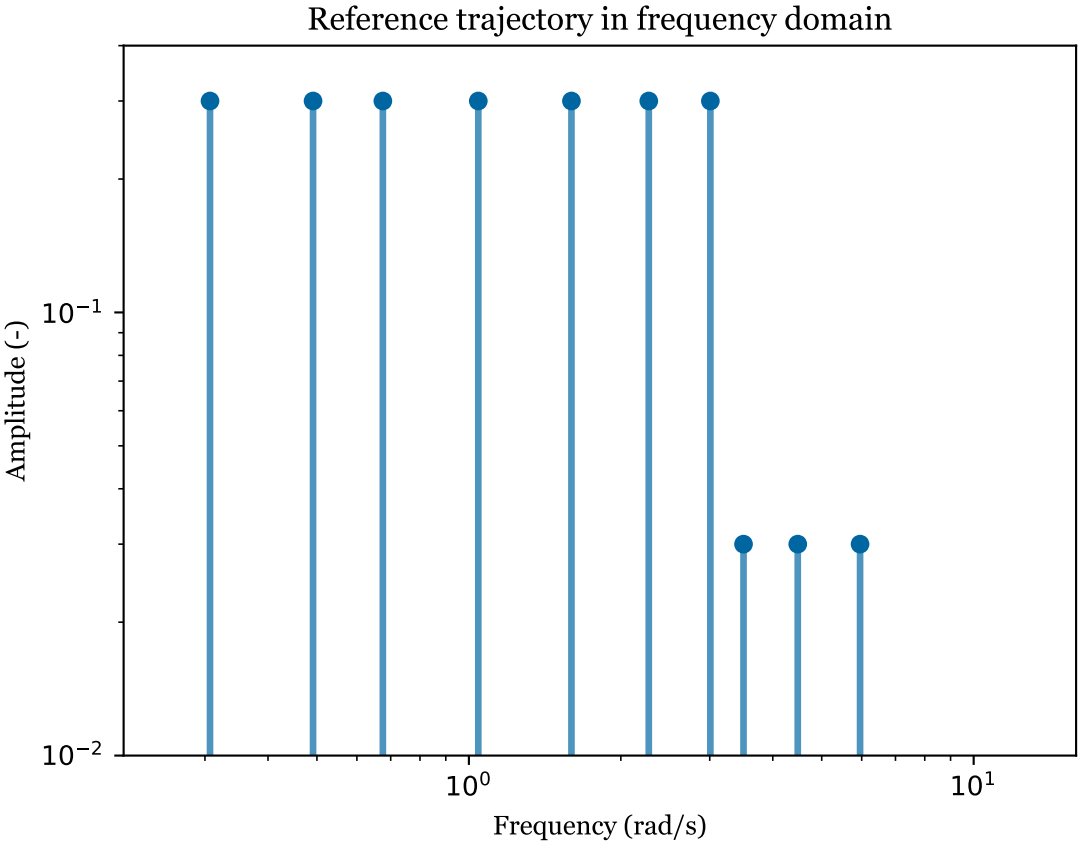
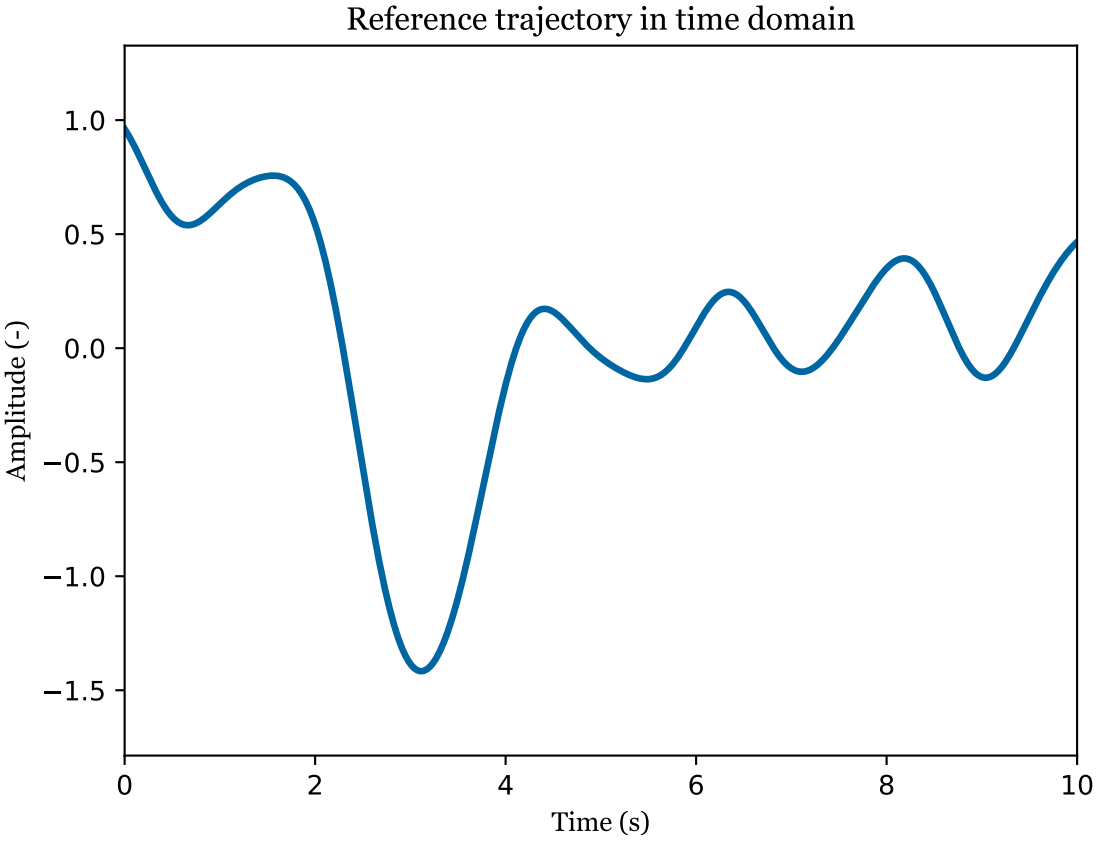
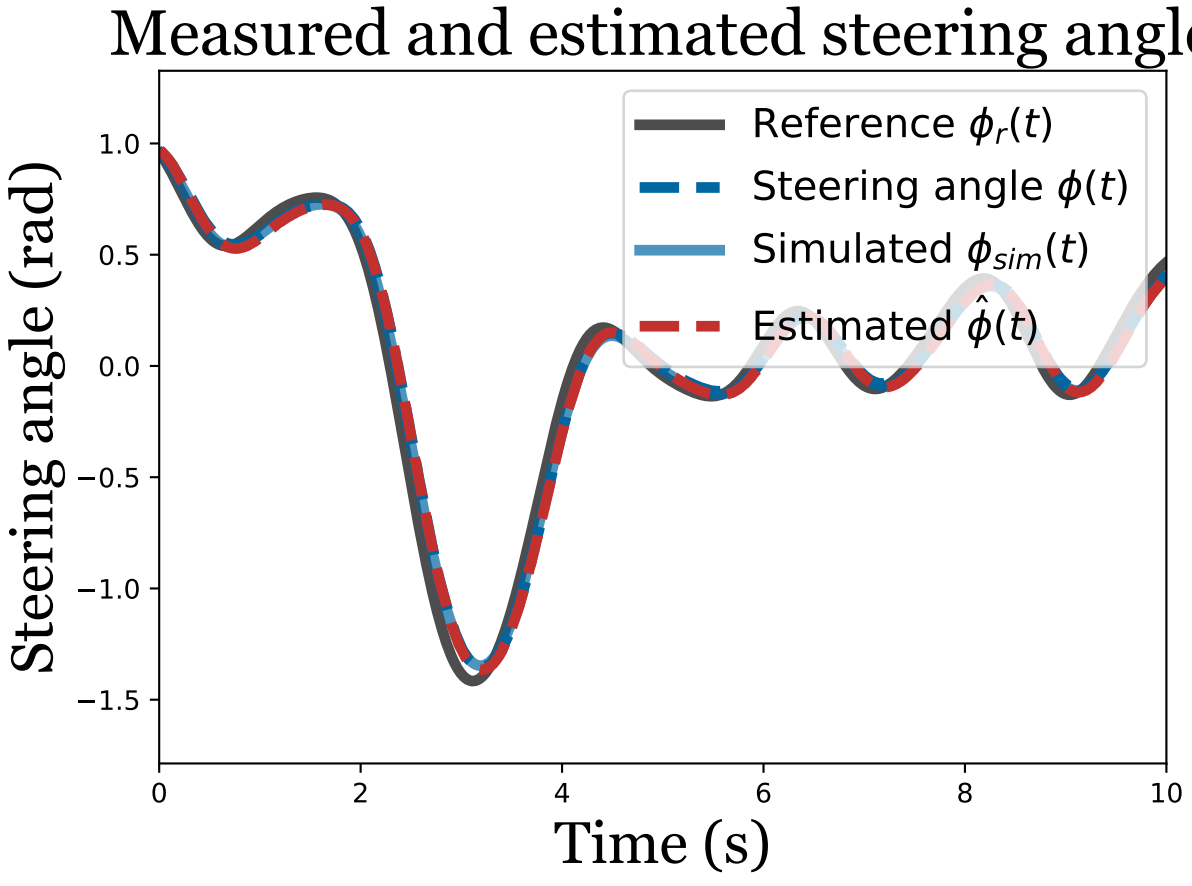
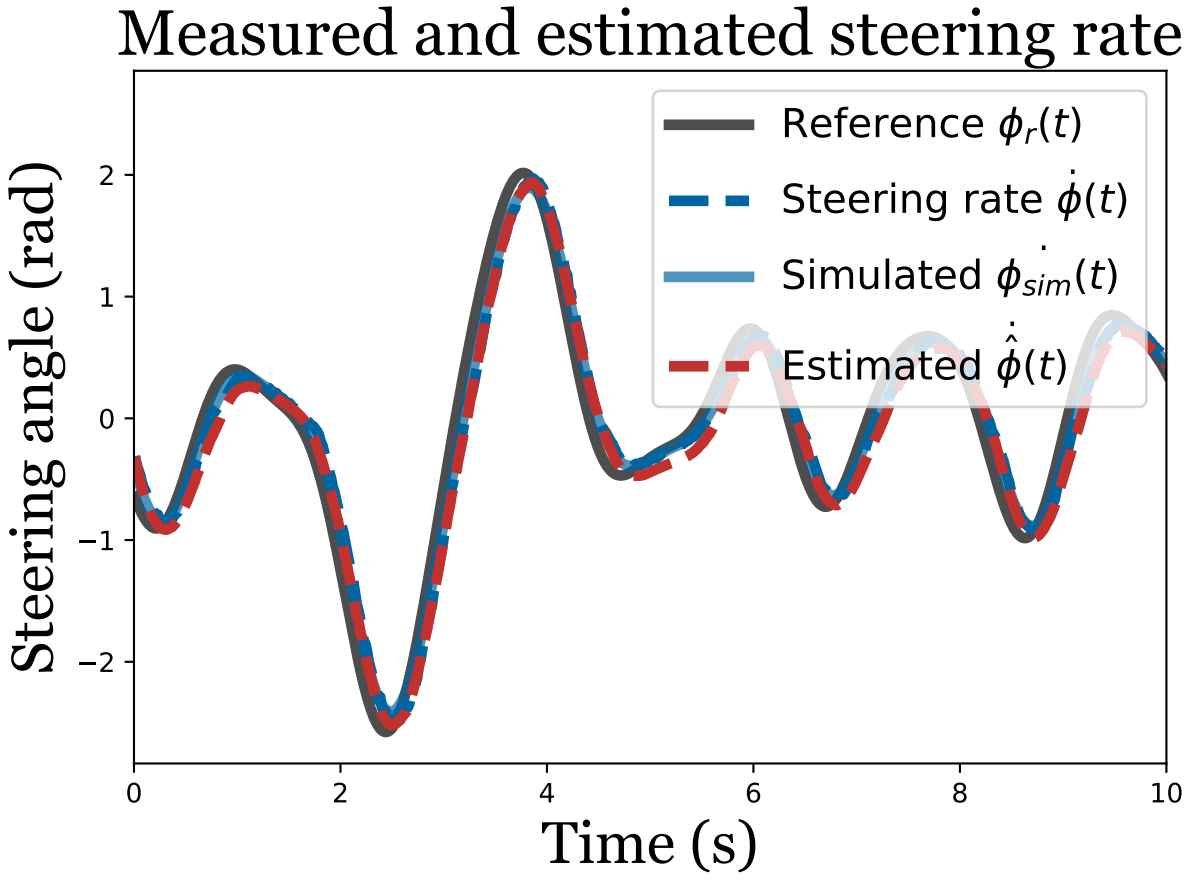
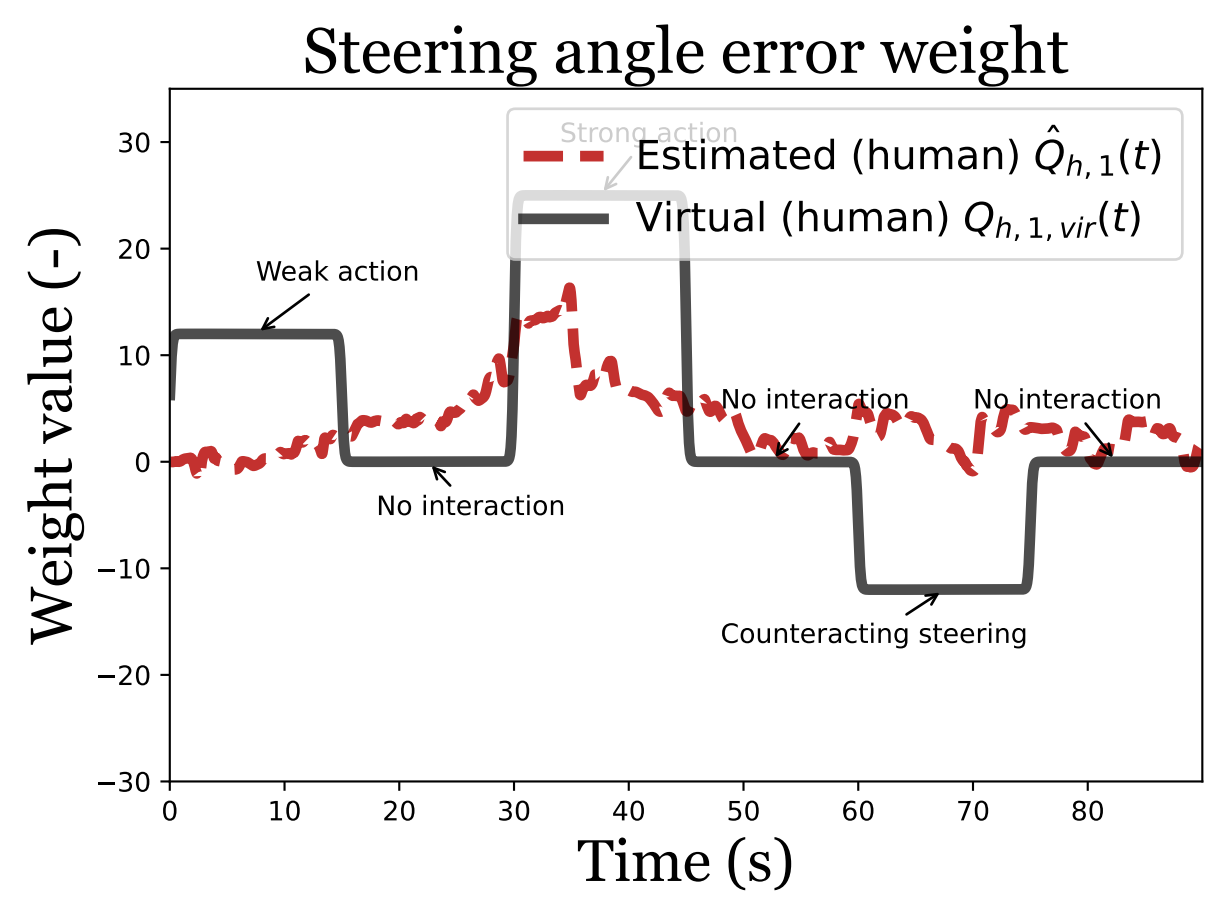
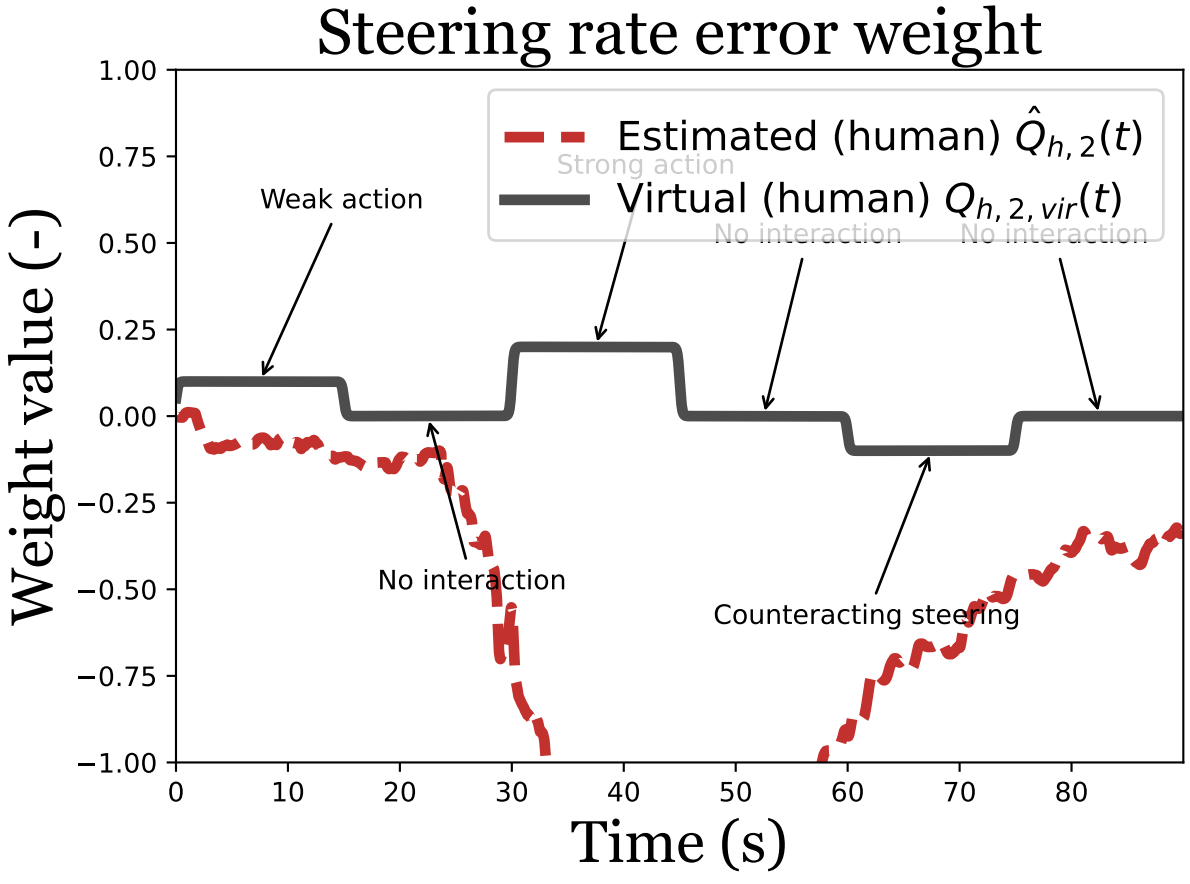

Reference trajectory in frequency domain
Amplitude (-)
10^{-1}
10^{-2}
10^{0}
10^{1}
Frequency (rad/s)

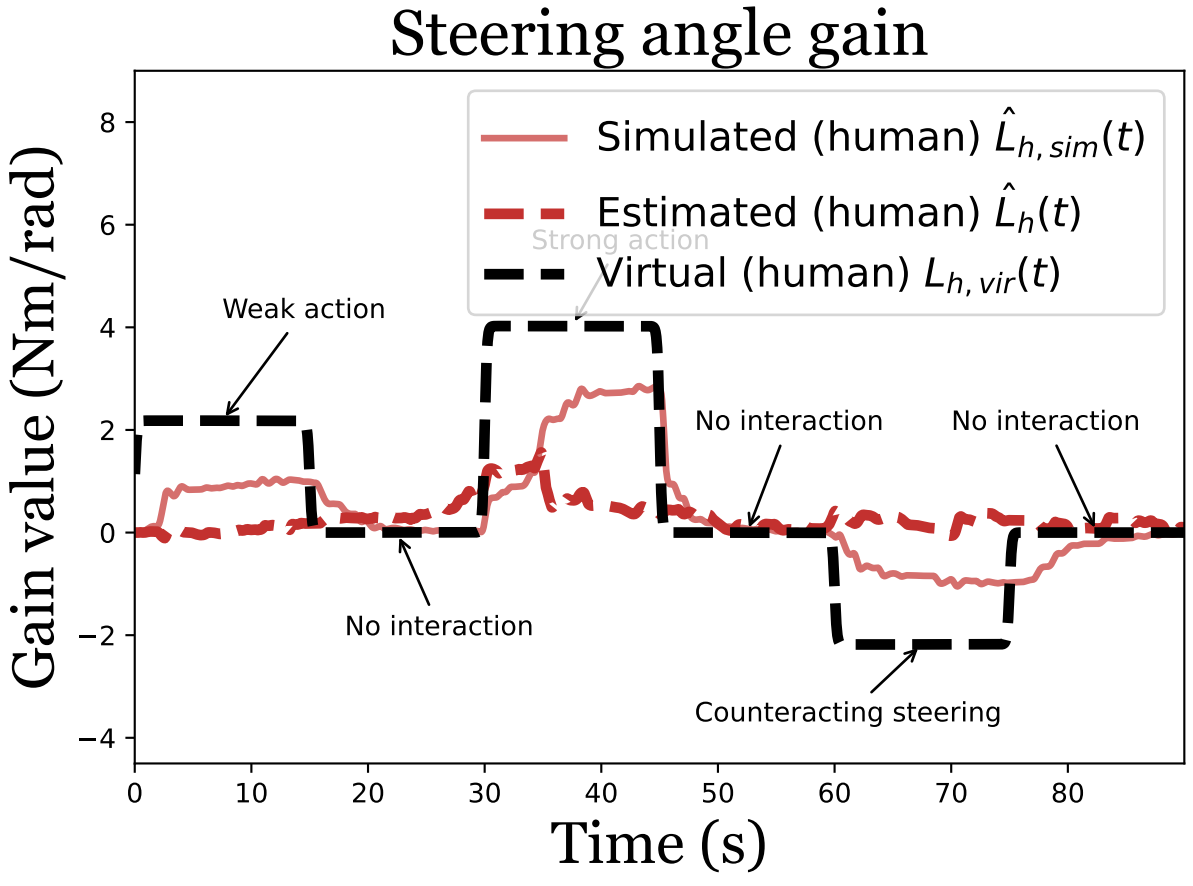

Reference trajectory in time domain
Amplitude (-)
1.0
0.5
0.0
−0.5
−1.0
−1.5
0
2
4
6
8
10
Time (s)

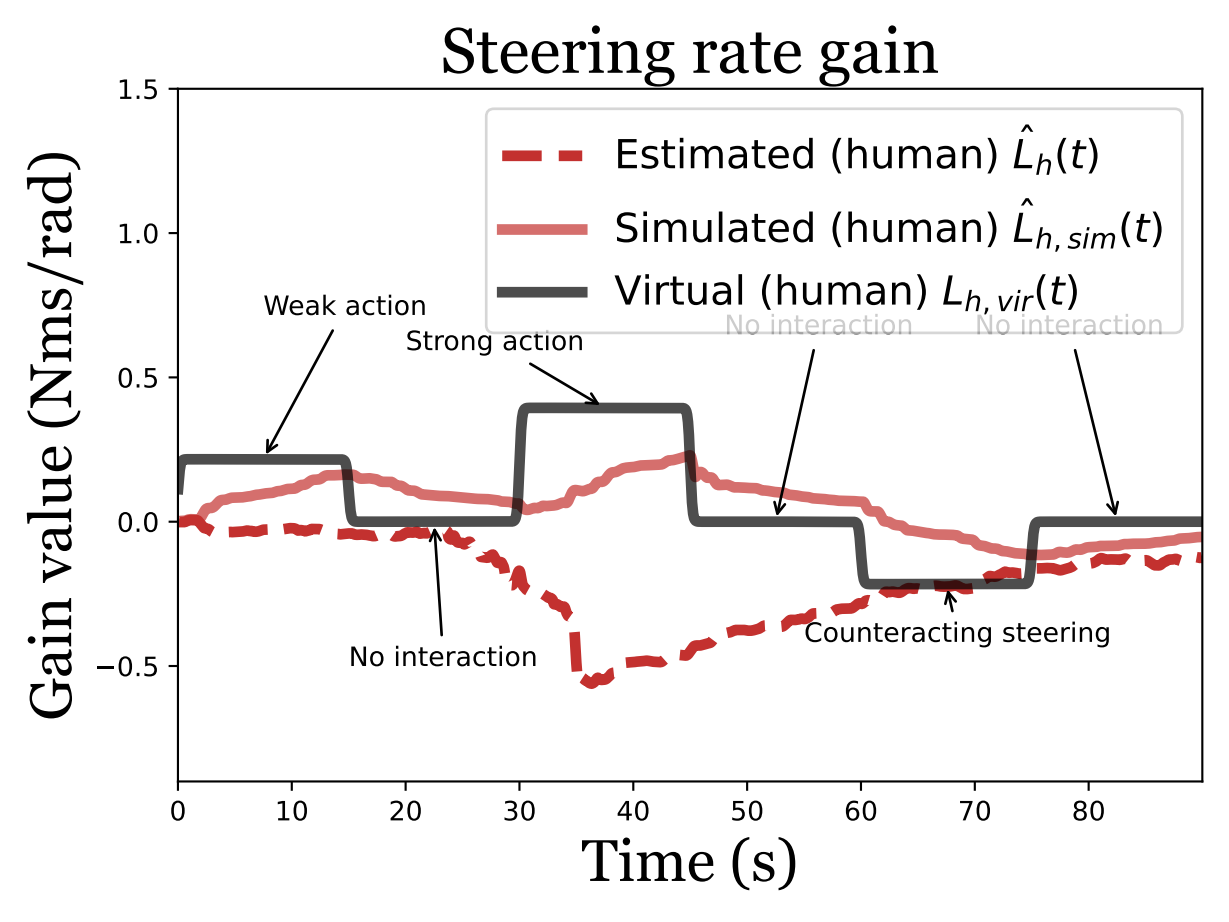

Measured and estimated steering angle
Reference $\phi_r(t)$
Steering angle $\phi(t)$
Simulated $\phi_{sim}(t)$
Estimated $\hat{\phi}(t)$
Steering angle (rad)
1.0
0.5
0.0
−0.5
−1.0
−1.5
0
2
4
6
8
10
Time (s)


Measured and estimated steering rate
Reference $\phi_r(t)$
Steering rate $\dot{\phi}(t)$
Simulated $\dot{\phi}_{sim}(t)$
Estimated $\dot{\hat{\phi}}(t)$
Steering angle (rad)
Time (s)
2
1
0
−1
−2
0
2
4
6
8
10


Steering angle error weight
Strong action
Estimated (human) $\hat{Q}_{h,1}(t)$
Virtual (human) $Q_{h,1,vir}(t)$
Weak action
No interaction
No interaction
No interaction
Counteracting steering
Weight value (-)
Time (s)
30
20
10
0
−10
−20
−30
0
10
20
30
40
50
60
70
80


Steering rate error weight
Estimated (human) $\hat{Q}_{h,2}(t)$
Virtual (human) $Q_{h,2,vir}(t)$
Weak action
Strong action
No interaction
No interaction
No interaction
Counteracting steering
Weight value (-)
Time (s)
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
0
10
20
30
40
50
60
70
80


Steering angle gain
Simulated (human) $\hat{L}_{h,sim}(t)$
Estimated (human) $\hat{L}_h(t)$
Virtual (human) $L_{h,vir}(t)$
Weak action
Strong action
No interaction
No interaction
No interaction
Counteracting steering
Gain value (Nm/rad)
Time (s)
8
6
4
2
0
−2
−4
0
10
20
30
40
50
60
70
80


Steering rate gain
Estimated (human) $\hat{L}_h(t)$
Simulated (human) $\hat{L}_{h,sim}(t)$
Virtual (human) $L_{h,vir}(t)$
Weak action
Strong action
No interaction
No interaction
No interaction
Counteracting steering
Gain value (Nms/rad)
Time (s)
1.5
1.0
0.5
0.0
−0.5
0
10
20
30
40
50
60
70
80