A complete benchmark model of Quanser's 3 DOF Helicopter Simulink© implementation

Mirko Brentari, Paolo Bosetti, Isabelle Queinnec, and Luca Zaccarian

January 22, 2018

1 How to run it

In order to launch the Simulink/Simscape© implementation of the model and the controller proposed in the paper, run the `helico_main.m` script. It loads the simulation parameters and runs the `helico_model.slx` model. The model is developed in Matlab version R2017a.

2 List of parameters

paper name	simulink name
c_λ	`par.id.cl`
$\widetilde{b}_\lambda$	`par.id.bl`
$a_{\epsilon 1}$	`par.id.ae1`
$a_{\epsilon 2}$	`par.id.ae2`
c_ϵ	`par.id.ce`
$\widetilde{b}_\epsilon$	`par.id.be`
a_θ	`par.id.at`
c_θ	`par.id.ct`
$\widetilde{b}_\theta$	`par.id.bt`
p_1^-	`par.exp.scaled_f_2_v_par(2,1)`
p_2^-	`par.exp.scaled_f_2_v_par(2,2)`
p_3^-	`par.exp.scaled_f_2_v_par(2,3)`
p_1^+	`par.exp.scaled_f_2_v_par(1,1)`
p_2^+	`par.exp.scaled_f_2_v_par(1,2)`
p_3^+	`par.exp.scaled_f_2_v_par(1,3)`
l_1	`par.l1`
l_2	`par.l2`
l_3	`par.l3`
d_1	`par.d1`
d_2	`par.d2`
m_2	`par.m2`
m_3	`par.m3`
r_λ	`par.r_lambda`
r_ϵ	`par.r_epsilon`
r_θ	`par.r_theta`
$k_{\gamma f}$	`par.k_taudrag_f`
c	`par.input`
Ω	`par.ctrl.Omega`
Ξ	`par.ctrl.Xi`
E	`par.est.high_gain_scaling`