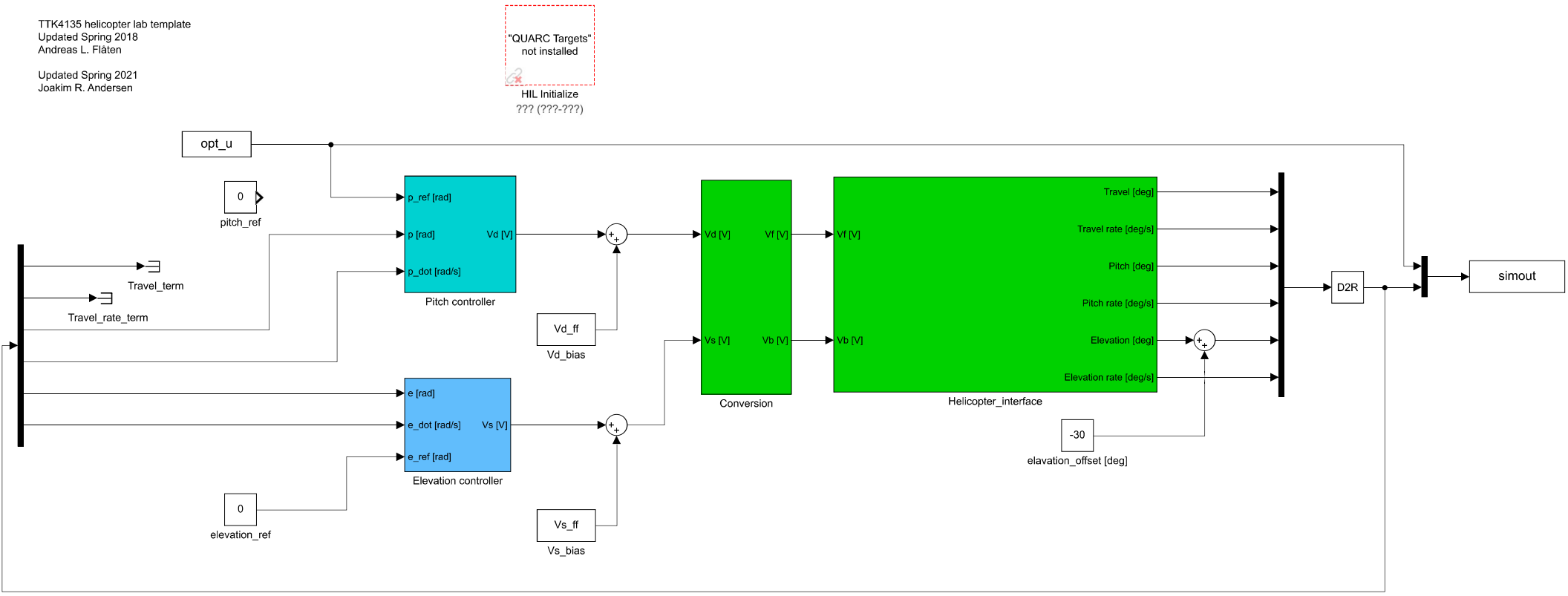
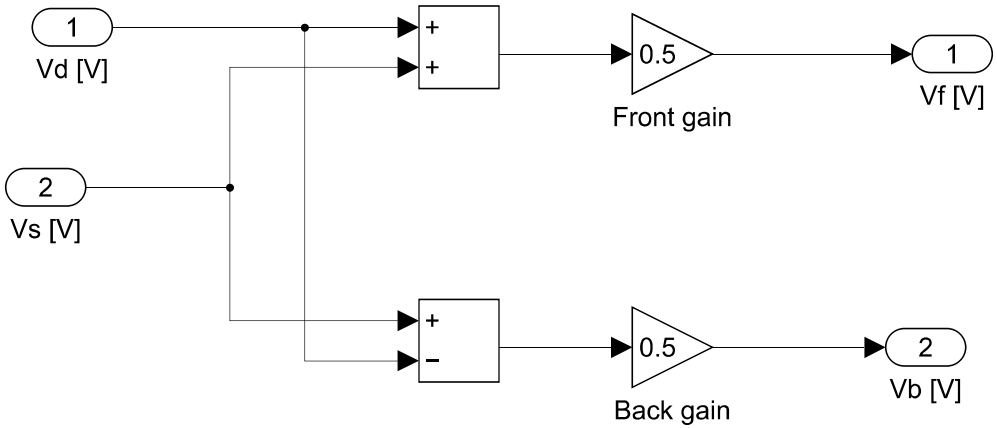
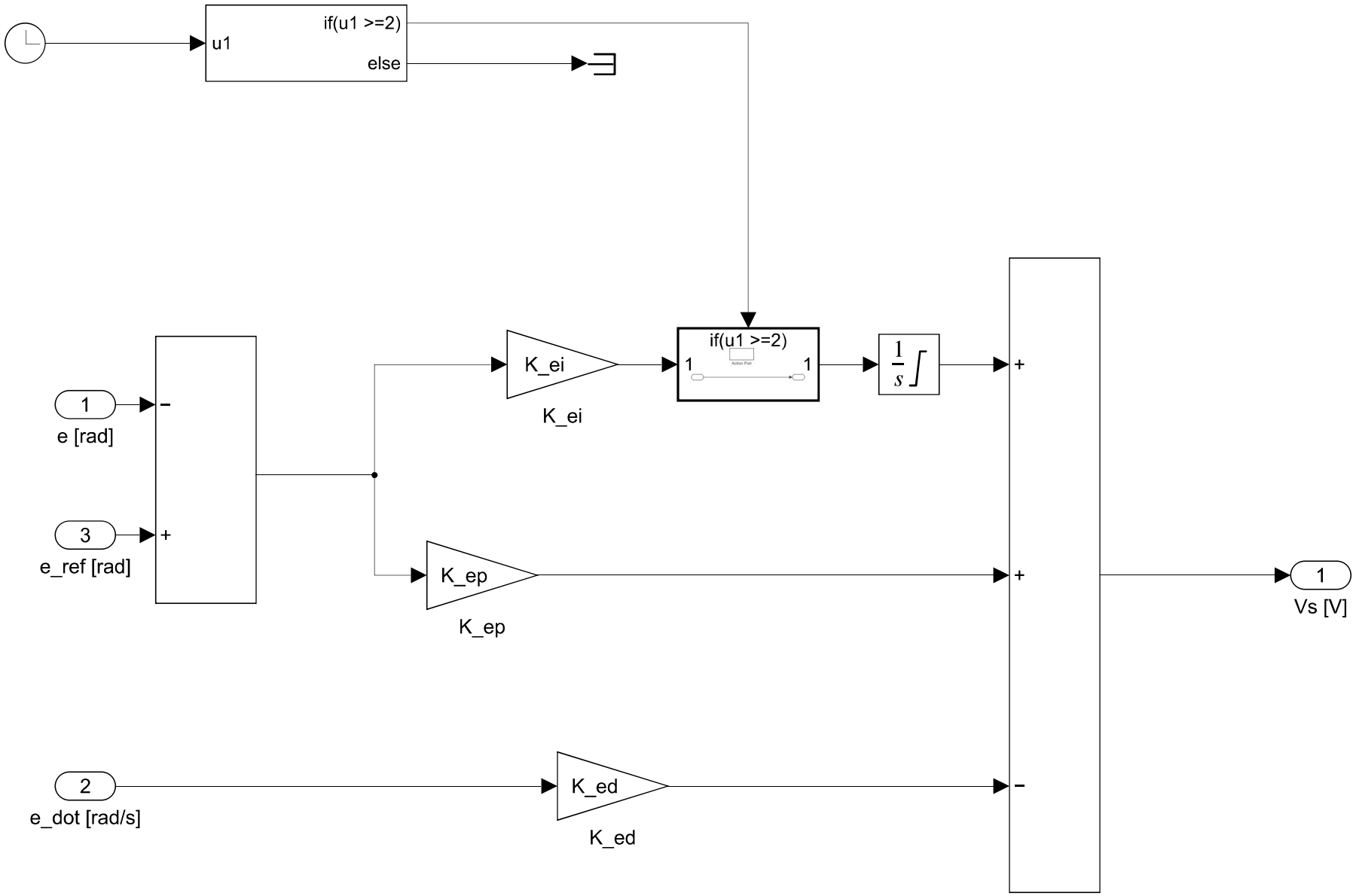
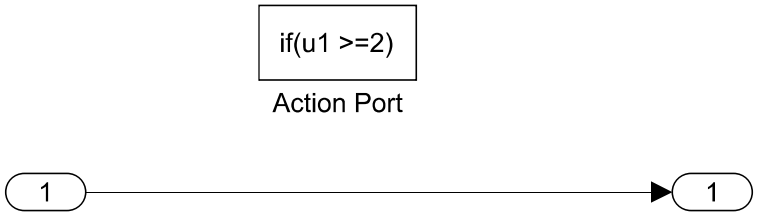
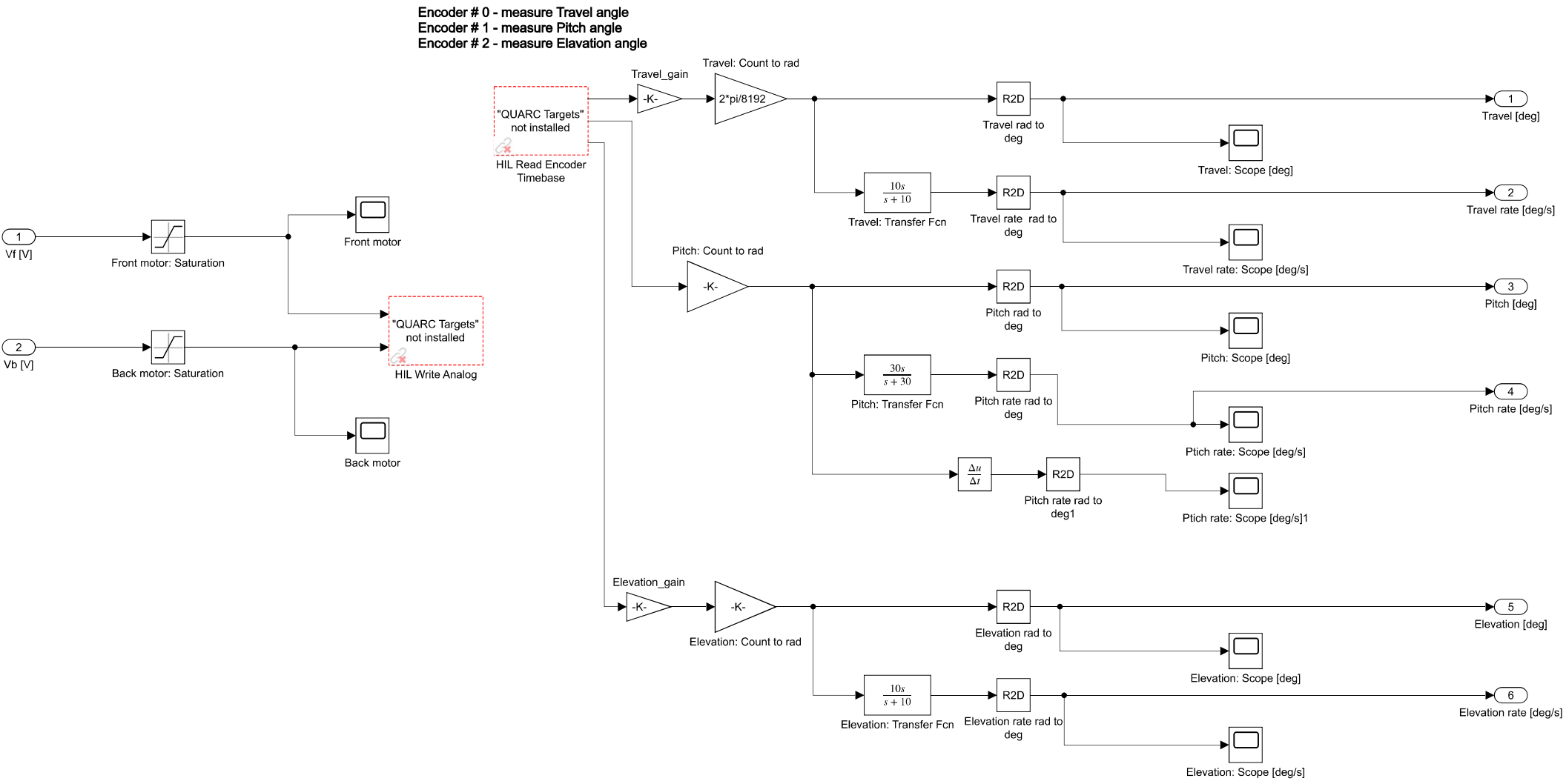
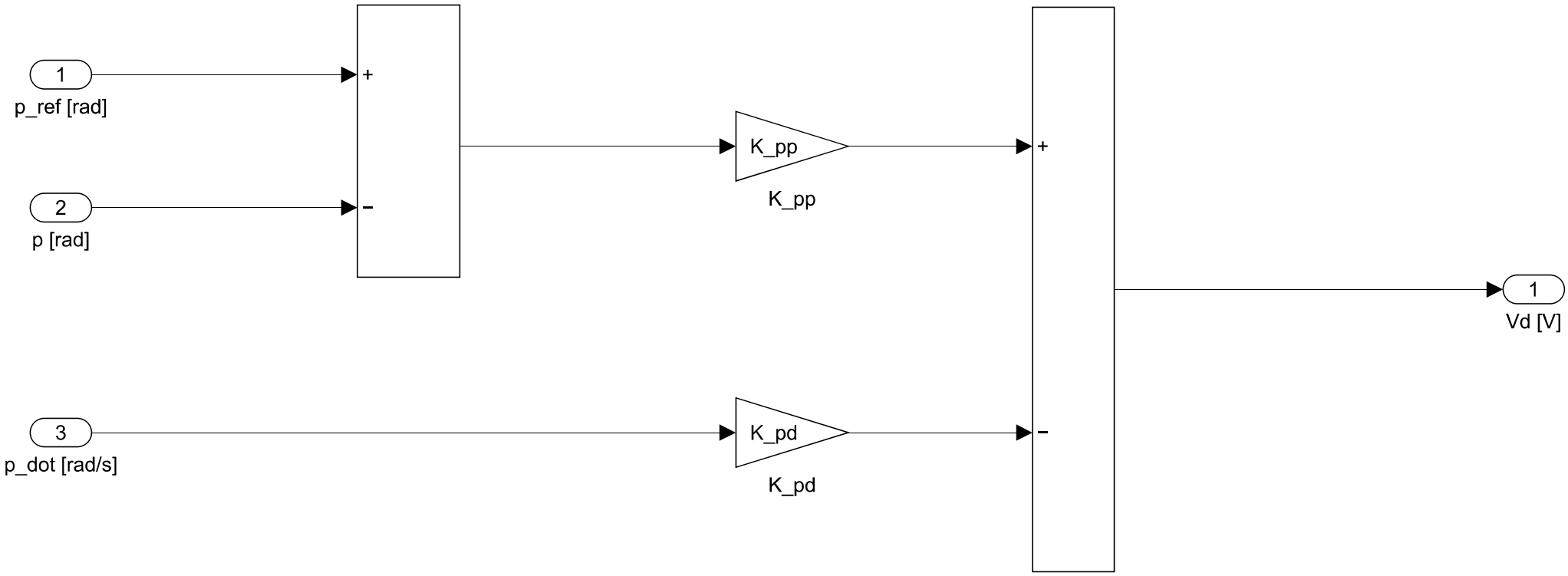

TTK4135 helicopter lab template
Updated Spring 2018
Andreas L. Fláten
Updated Spring 2021
Joakim R. Andersen
"QUARC Targets" not installed
HIL Initialize
??? (???-???)
opt_u
0
pitch_ref
p_ref [rad]
p [rad]
p_dot [rad/s]
Vd [V]
Pitch controller
Travel_term
Travel_rate_term
Vd_ff
Vd_bias
Vd [V]
Vf [V]
Vs [V]
Vb [V]
Conversion
Vf [V]
Vb [V]
Travel [deg]
Travel rate [deg/s]
Pitch [deg]
Pitch rate [deg/s]
Elevation [deg]
Elevation rate [deg/s]
Helicopter_interface
D2R
simout
e [rad]
e_dot [rad/s]
e_ref [rad]
Vs [V]
Elevation controller
-30
elavation_offset [deg]
0
elevation_ref
Vs_ff
Vs_bias


1
Vd [V]
2
Vs [V]
+
+
+
−
0.5
0.5
Front gain
Back gain
1
Vf [V]
2
Vb [V]


u1
if(u1 >=2)
else
if(u1 >=2)
1
1
K_ei
K_ei
1
s
1
e [rad]
3
e_ref [rad]
K_ep
K_ep
2
e_dot [rad/s]
K_ed
K_ed
+
+
+
-
-
+
1
Vs [V]


if(u1 >=2)
Action Port
1
1


Encoder # 0 - measure Travel angle
Encoder # 1 - measure Pitch angle
Encoder # 2 - measure Elavation angle
"QUARC Targets" not installed
HIL Read Encoder Timebase
Travel_gain
-K-
Travel: Count to rad
2*pi/8192
R2D
Travel rad to deg
Travel: Scope [deg]
1
Travel [deg]
10s / s + 10
Travel: Transfer Fcn
Travel rate rad to deg
Travel rate: Scope [deg/s]
2
Travel rate [deg/s]
Pitch: Count to rad
Pitch rad to deg
Pitch: Scope [deg]
3
Pitch [deg]
30s / s + 30
Pitch: Transfer Fcn
Pitch rate rad to deg
Ptich rate: Scope [deg/s]
4
Pitch rate [deg/s]
Δu / Δt
Pitch rate rad to deg1
Ptich rate: Scope [deg/s]1
Elevation_gain
Elevation: Count to rad
Elevation rad to deg
Elevation: Scope [deg]
5
Elevation [deg]
Elevation: Transfer Fcn
Elevation rate rad to deg
Elevation: Scope [deg/s]
6
Elevation rate [deg/s]
1
Vf [V]
Front motor: Saturation
Front motor
2
Vb [V]
Back motor: Saturation
"QUARC Targets" not installed
HIL Write Analog
Back motor


1
p_ref [rad]
2
p [rad]
3
p_dot [rad/s]
+
-
K_pp
K_pp
K_pd
K_pd
+
-
1
Vd [V]