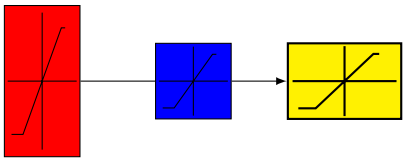
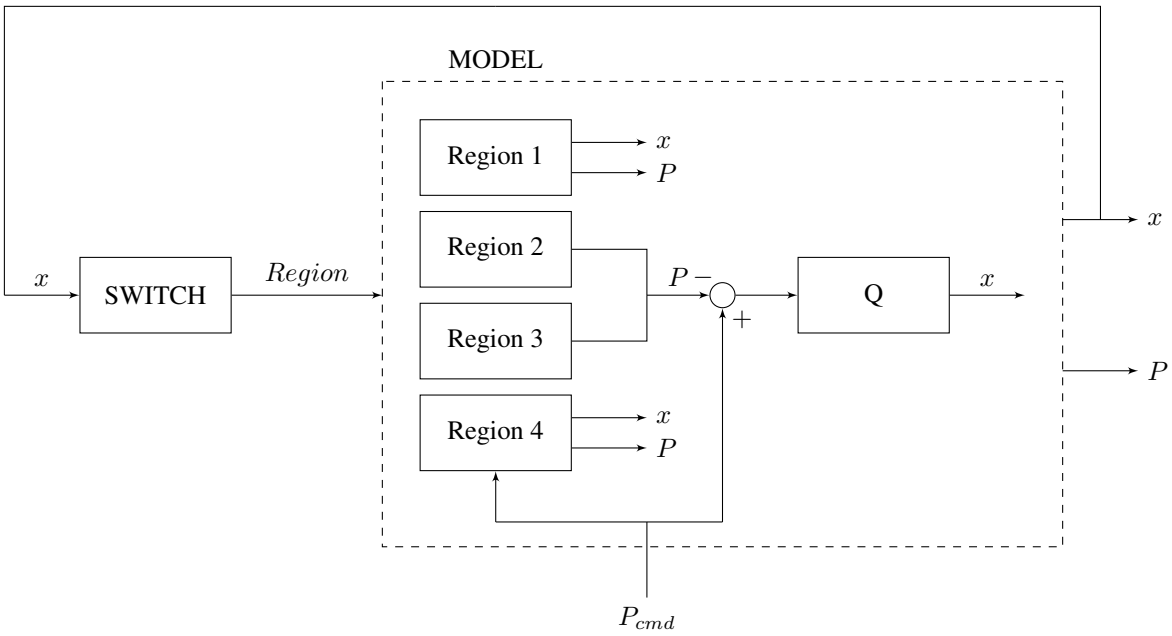
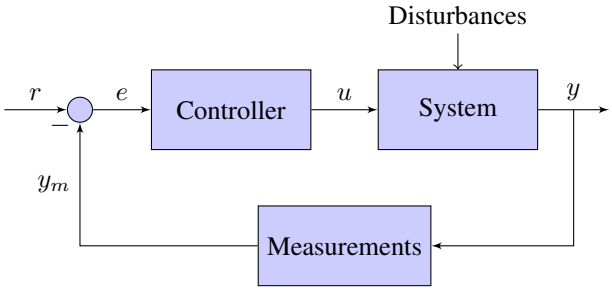


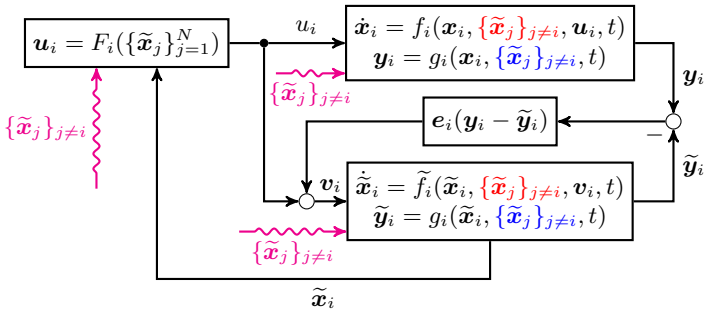
Sarah's Badass Example



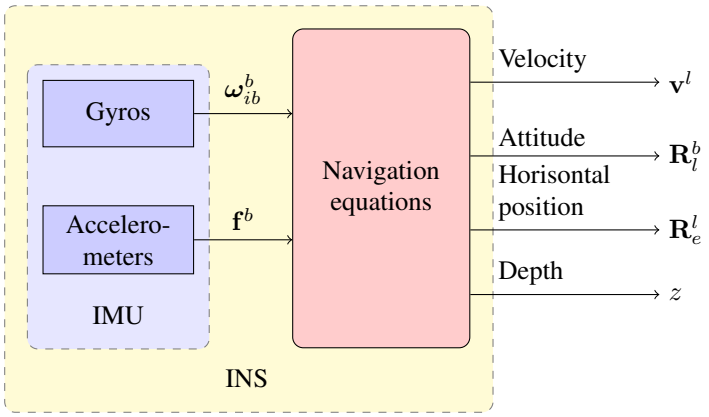
Example 1

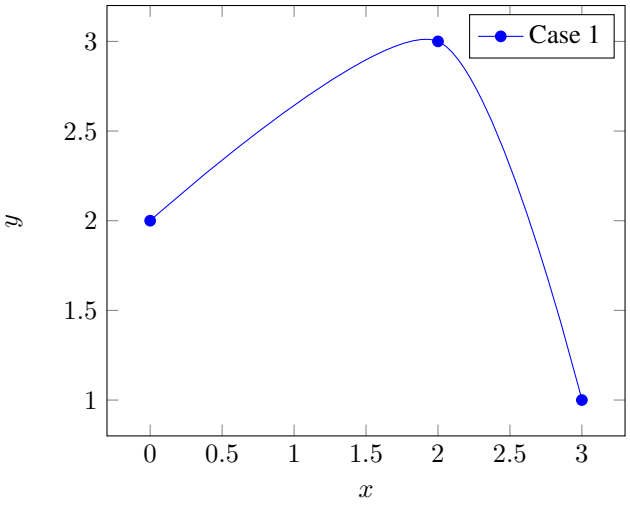


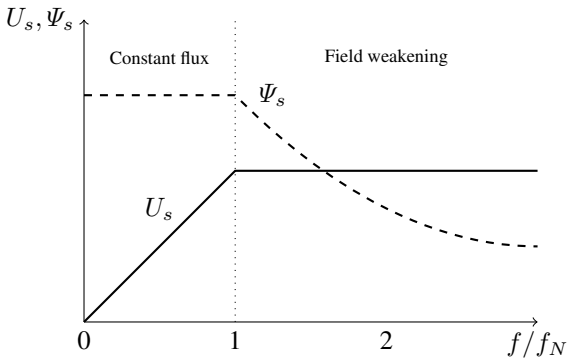
Example 2

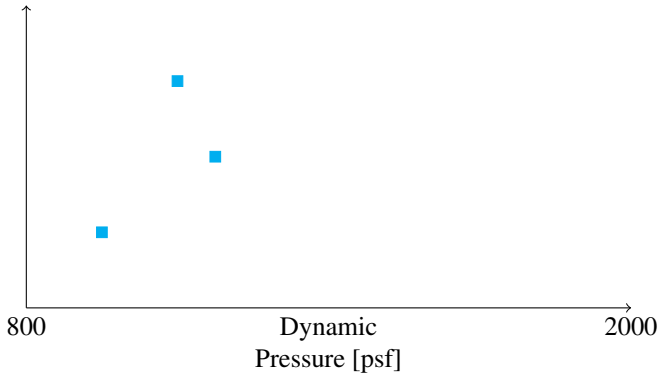


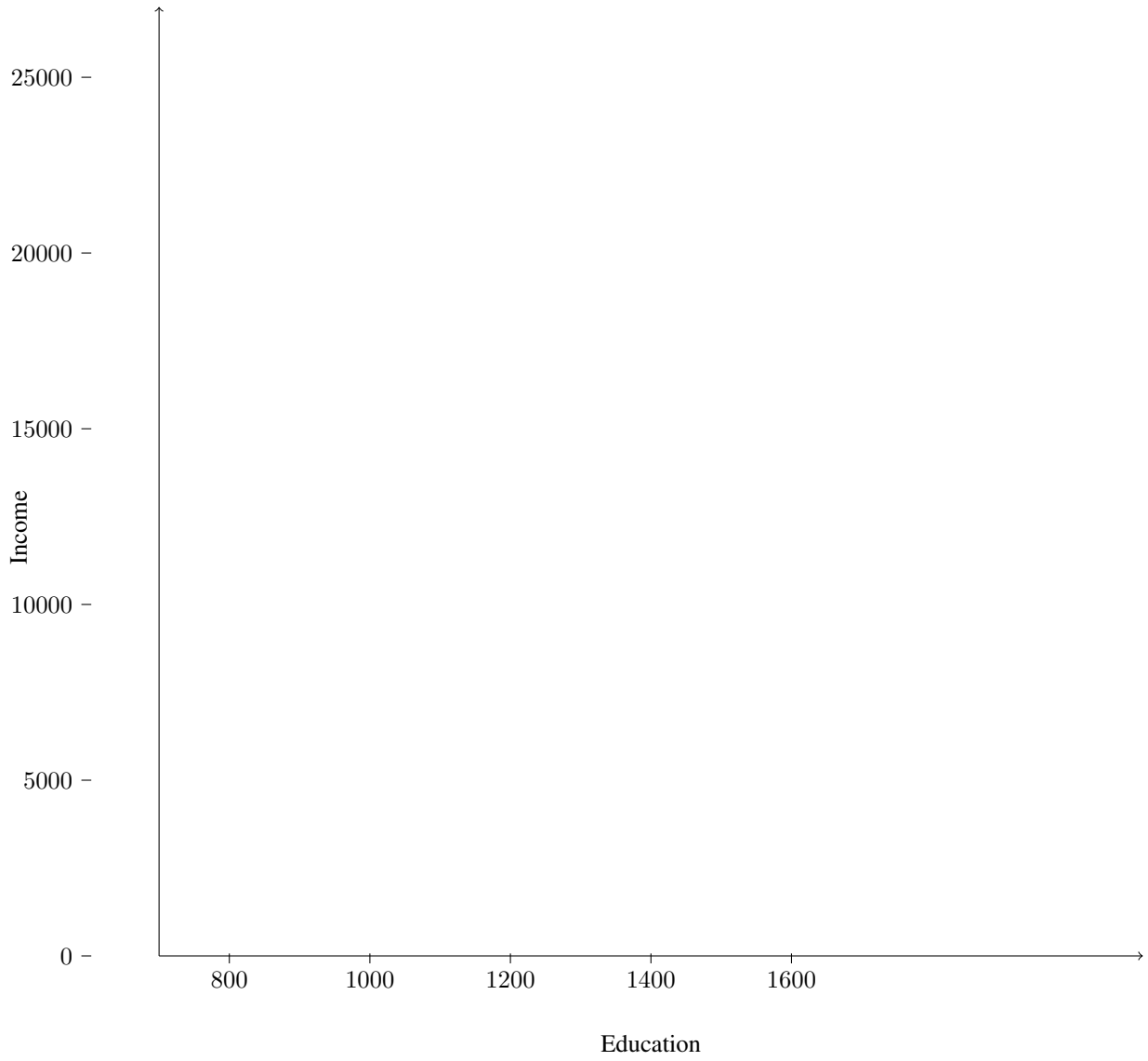
Example 3



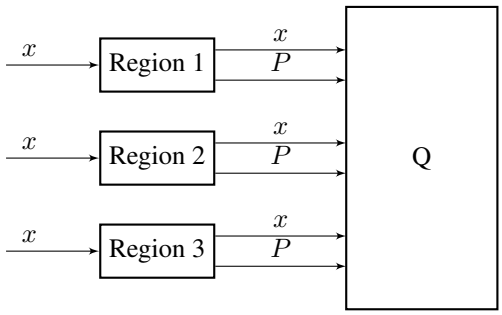

Case 1
3
2.5
2
1.5
1
y
0
0.5
1
1.5
2
2.5
3
x

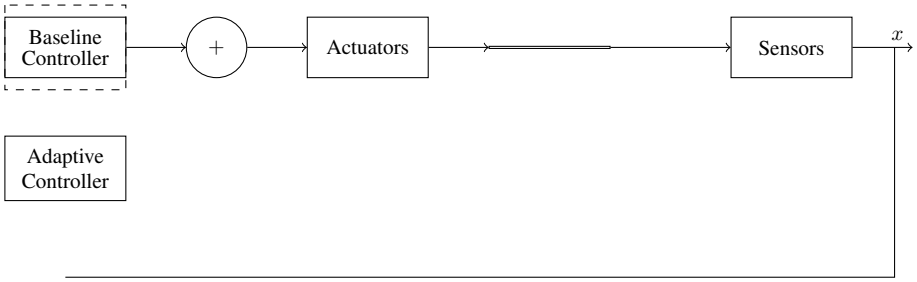

U_s, Ψ_s
Constant flux
Field weakening
Ψ_s
U_s
0
1
2
f/f_N

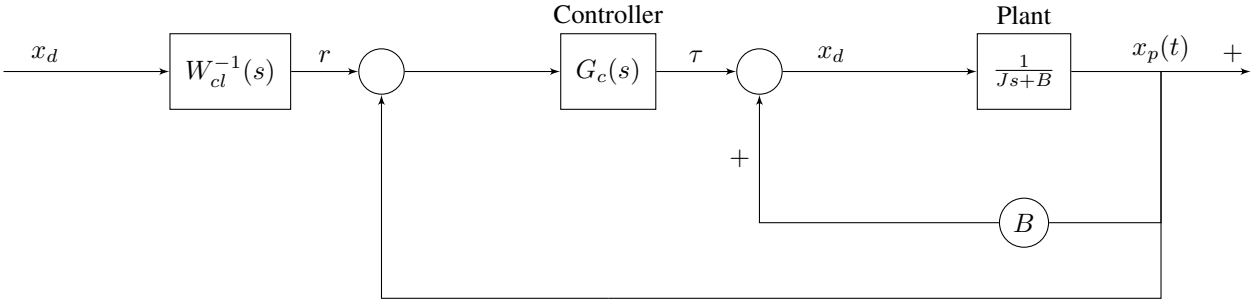

800
Dynamic
Pressure [psf]
2000

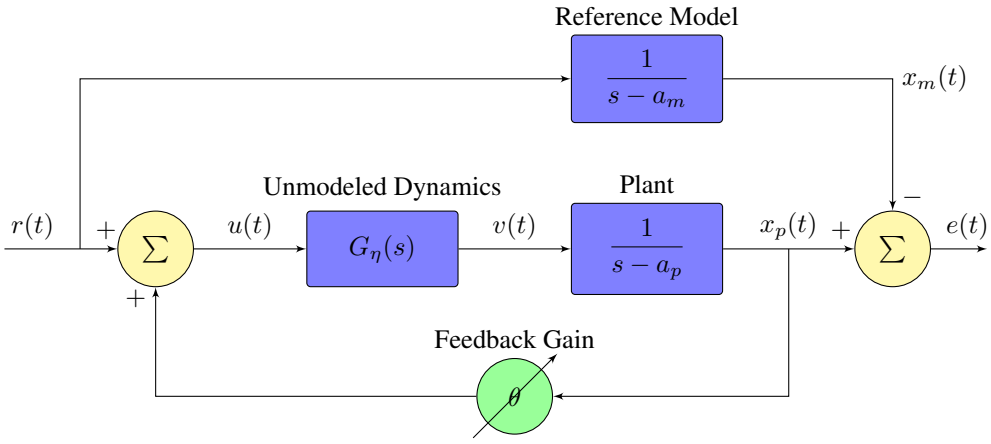

25000
20000
15000
10000
5000
0
Income
800
1000
1200
1400
1600
Education

Force Equation




Baseline Controller
+
Actuators
Sensors
x
Adaptive Controller


Controller
Plant
x_d
$W_{cl}^{-1}(s)$
r
$G_c(s)$
τ
x_d
$\frac{1}{Js+B}$
$x_p(t)$
+
+
B


Reference Model
$\frac{1}{s-a_m}$
$x_m(t)$
Unmodeled Dynamics
Plant
$r(t)$
+
$\sum$
$u(t)$
$G_\eta(s)$
$v(t)$
$\frac{1}{s-a_p}$
$x_p(t)$
+
−
$\sum$
$e(t)$
+
Feedback Gain
θ

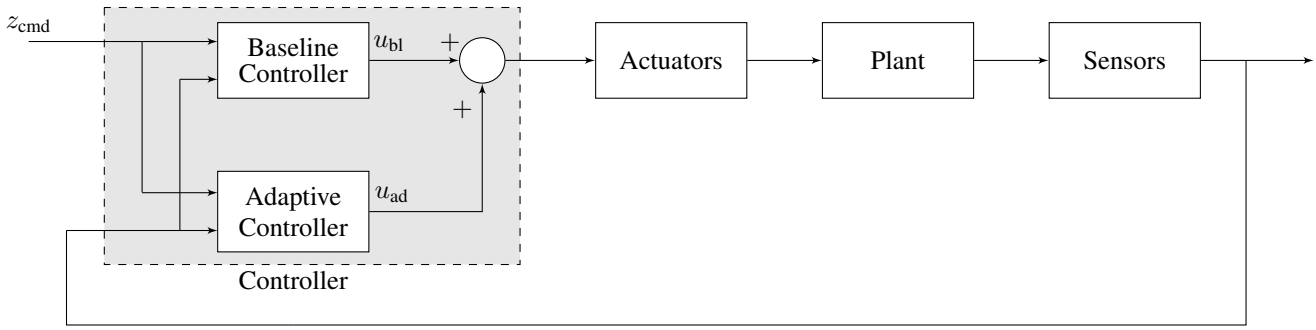


Figure 1: General MIMO feedback control block diagram

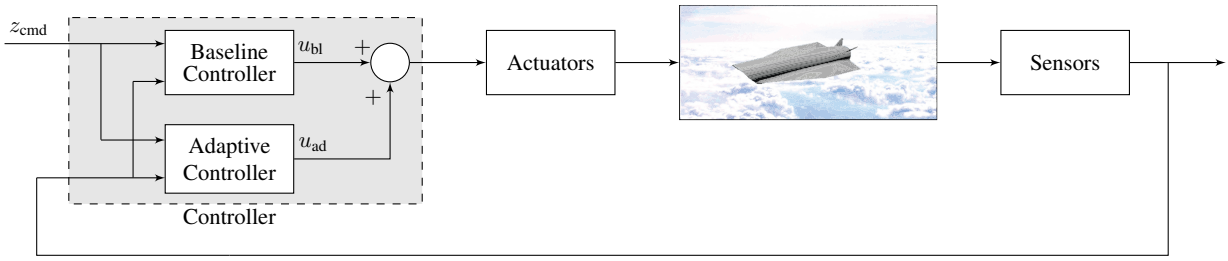


Figure 2: Baseline plus adaptive control block diagram

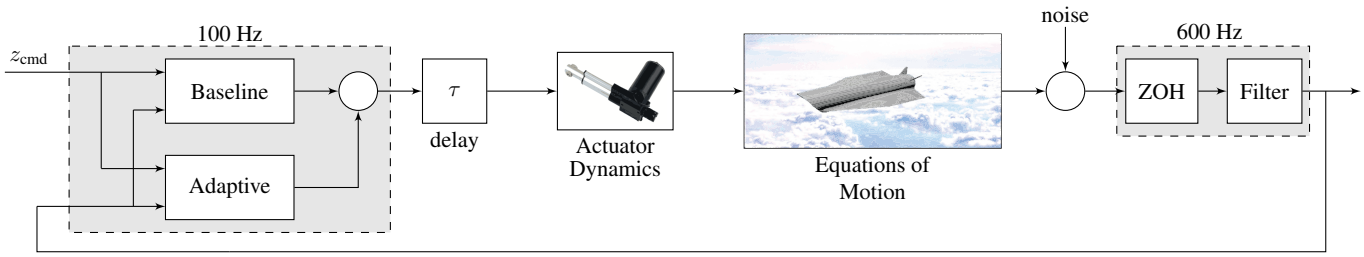


Figure 3: Baseline plus adaptive control block diagram

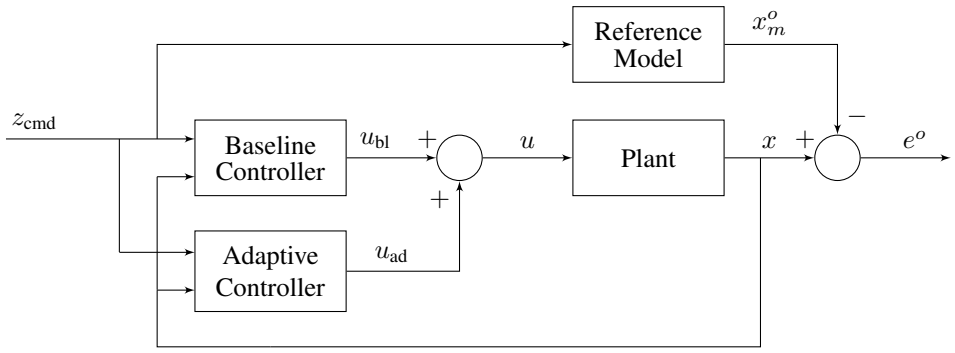


Figure 4: Classical model-reference adaptive control architecture

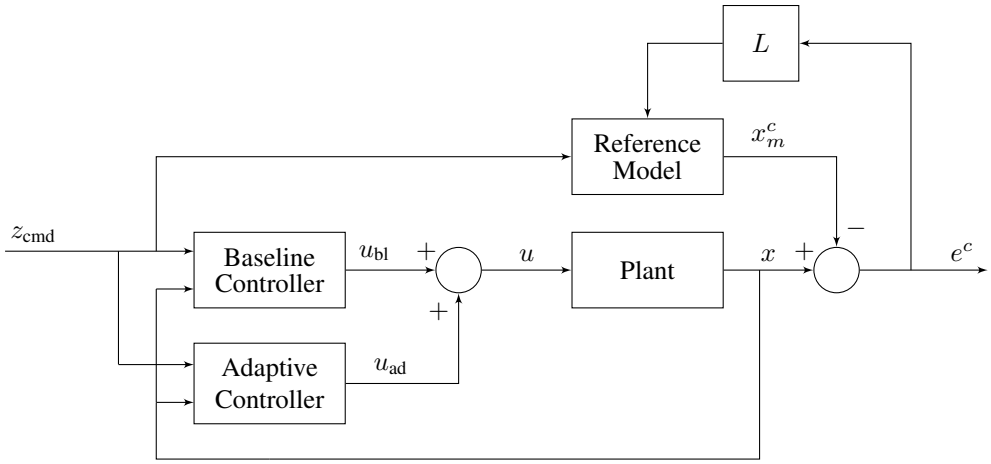
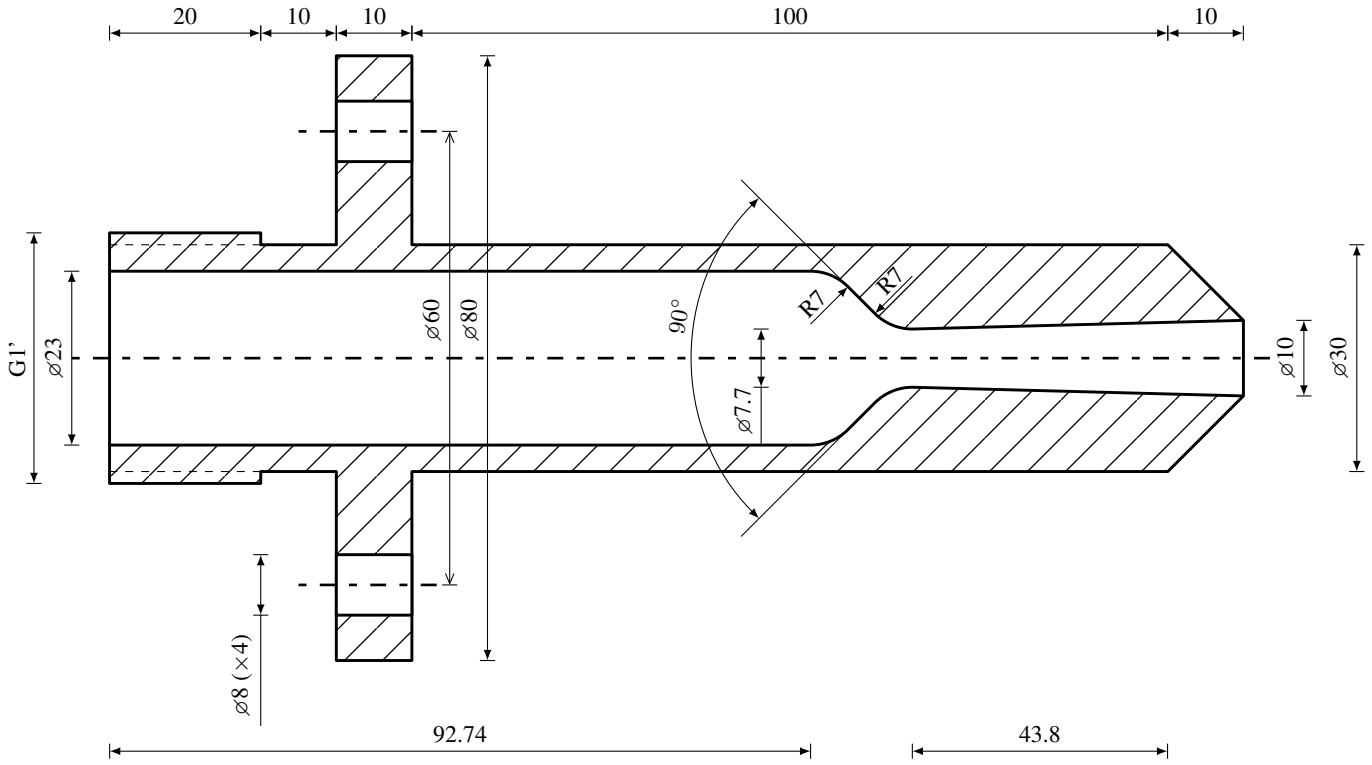
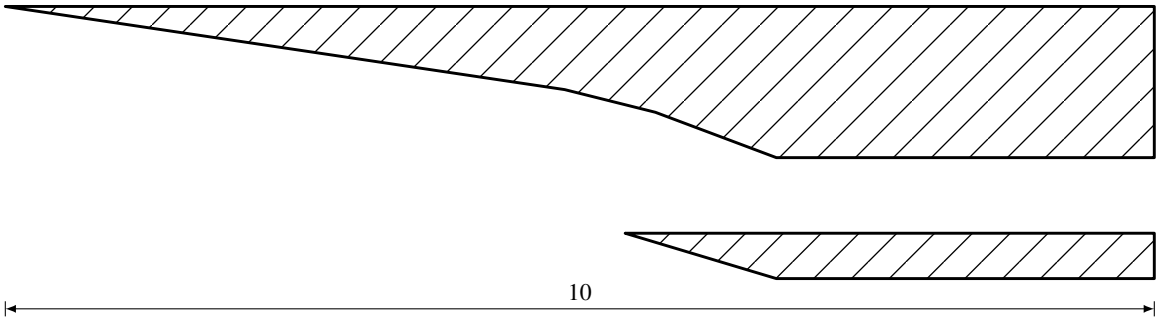


Figure 5: Closed loop reference model adaptive control architecture



All dimensions are in millimeters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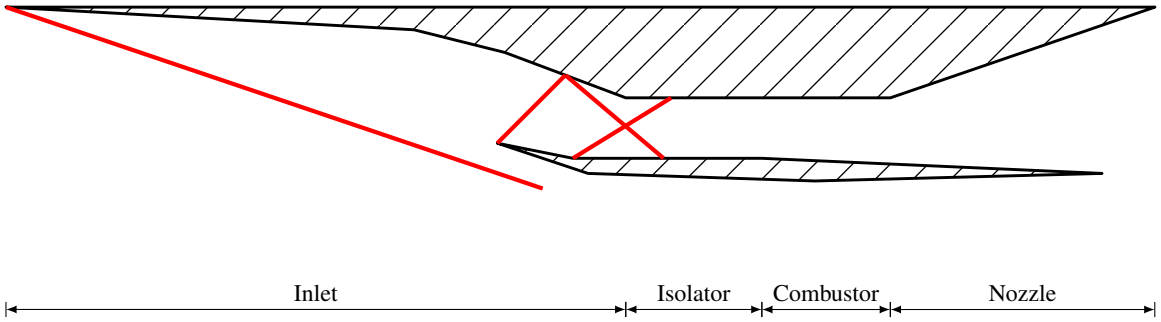
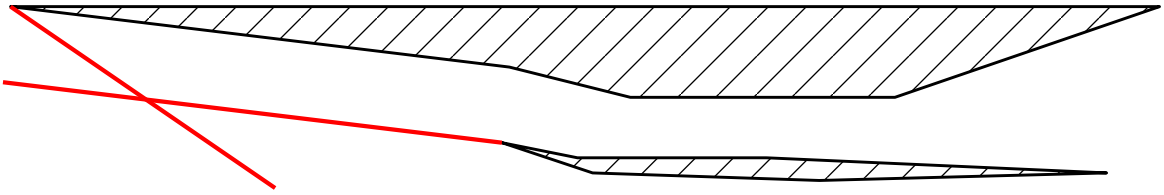
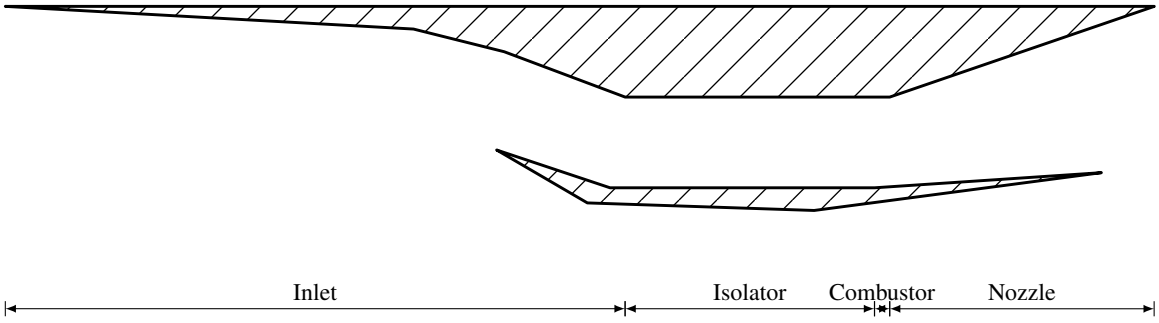


A FIGURE



RAMJET



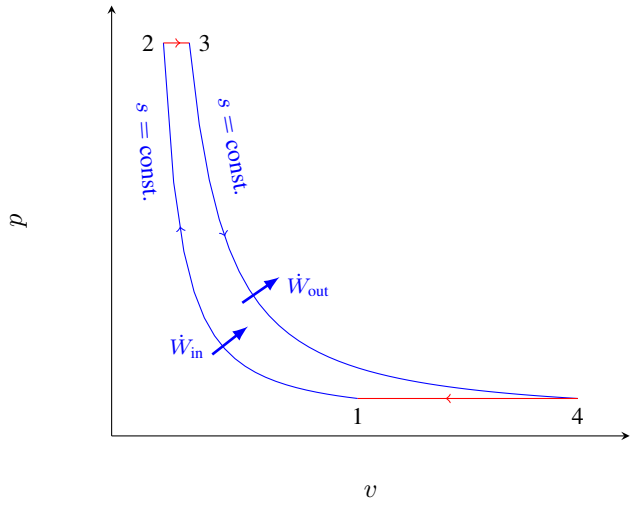


Figure 6: Ideal Brayton cycle

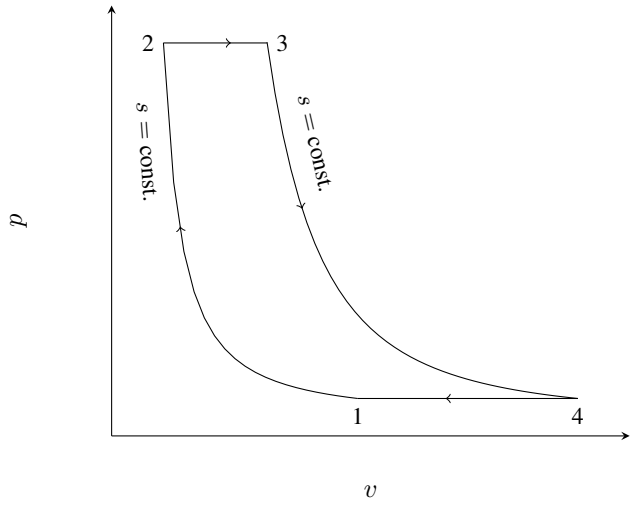
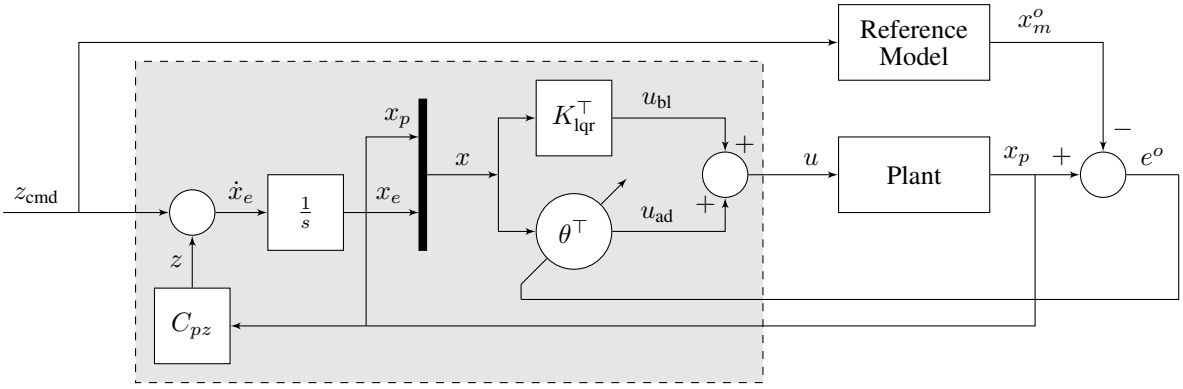
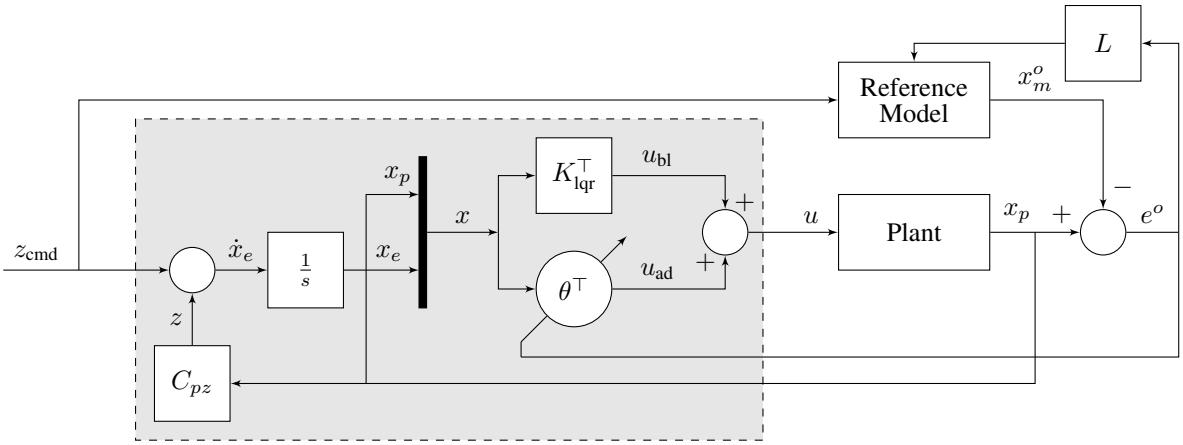


Figure 7: Ideal Brayton cycle P-v Diagram


Reference Model
x_m^o
x_p
$K_{\text{lqr}}^\top$
u_{bl}
x
u
Plant
x_p
e^o
z_{cmd}
$\dot{x}_e$
$\frac{1}{s}$
x_e
$\theta^\top$
u_{ad}
z
C_{pz}


L
Reference Model
x_m^o
x_p
$K_{\text{lqr}}^\top$
u_{bl}
x
$-$
z_{cmd}
$\dot{x}_e$
$\frac{1}{s}$
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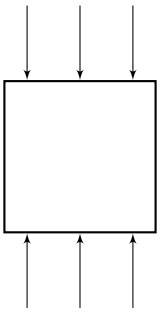
z
C_{pz}



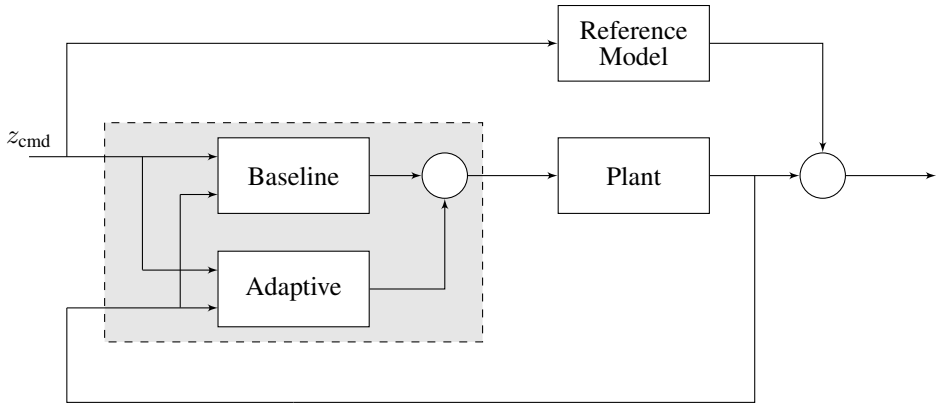


Figure 8: **Classical open loop reference model adaptive control architecture**

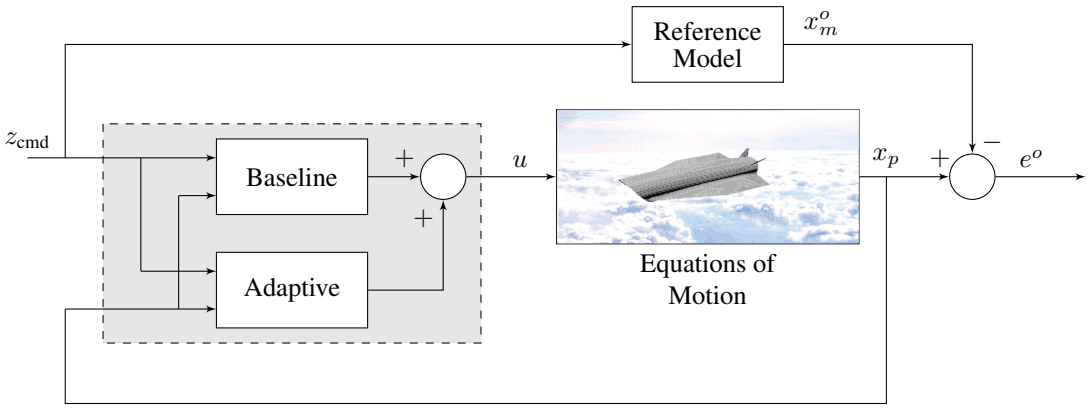


Figure 9: **Classical open loop reference model adaptive control architecture**

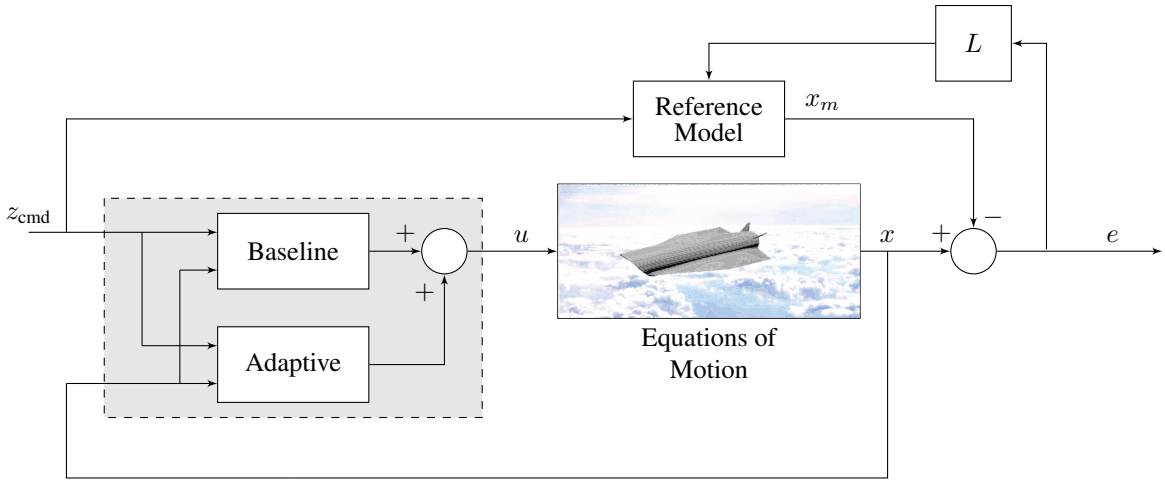


Figure 10: **Closed-loop reference model adaptive control architecture**

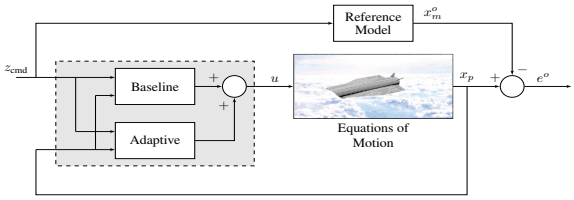
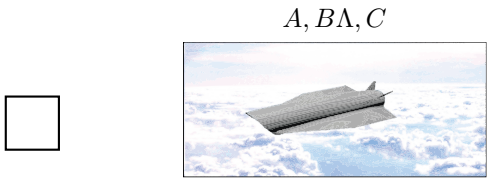
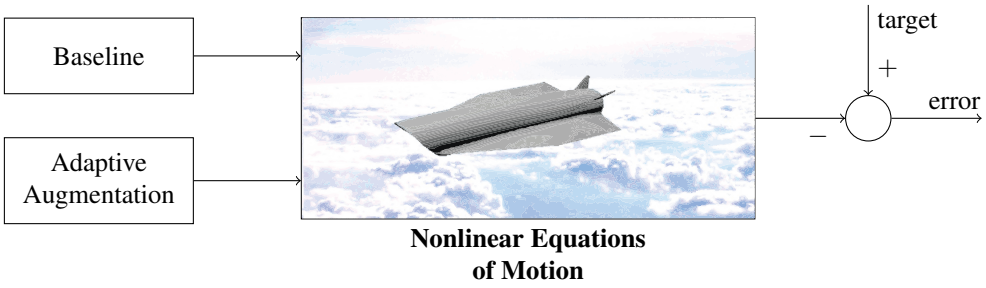


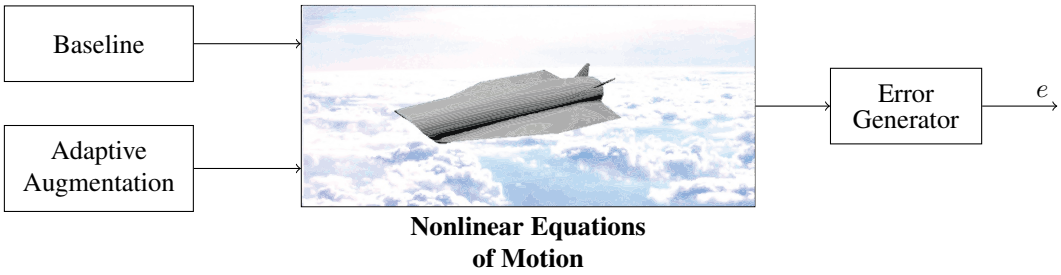
Figure 11: **Classical open loop reference model adaptive control architecture**



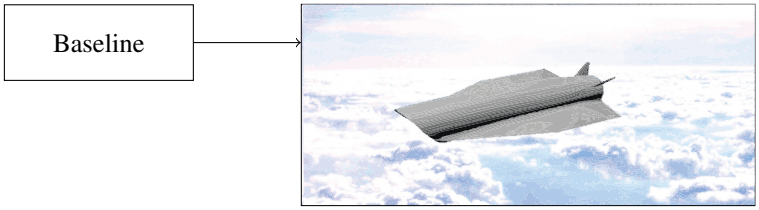
Example 3



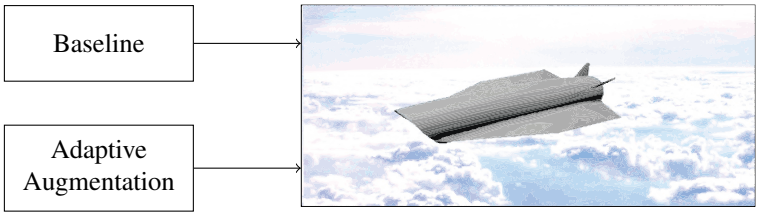
Example 3B



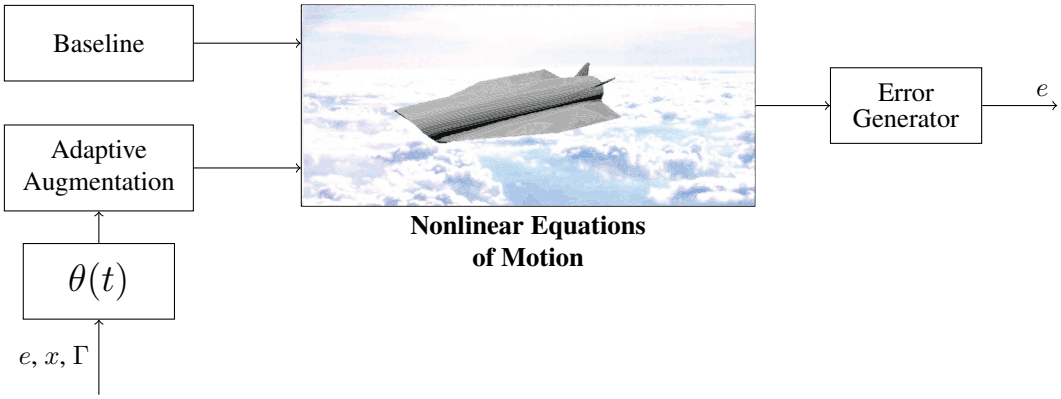
Example 3C



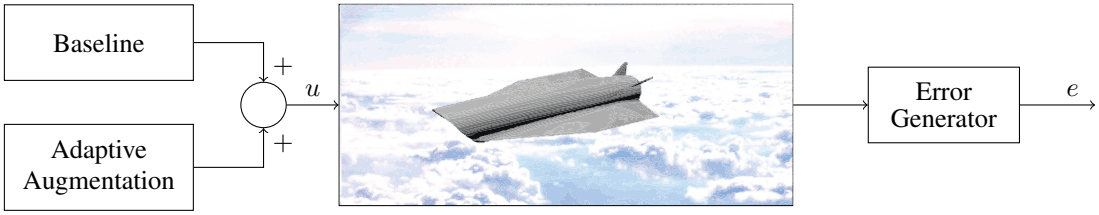
Example 3D



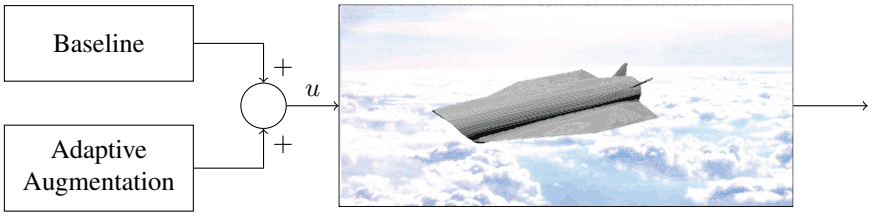
Example 4



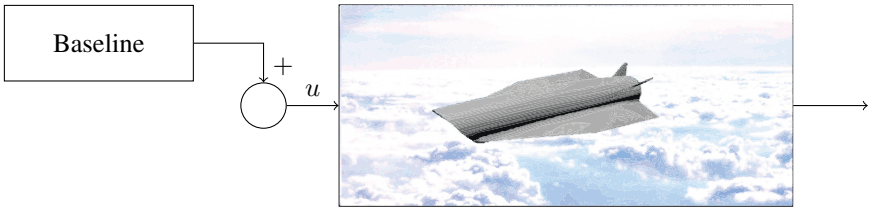
Example X



Example Y



Example Z



Another One

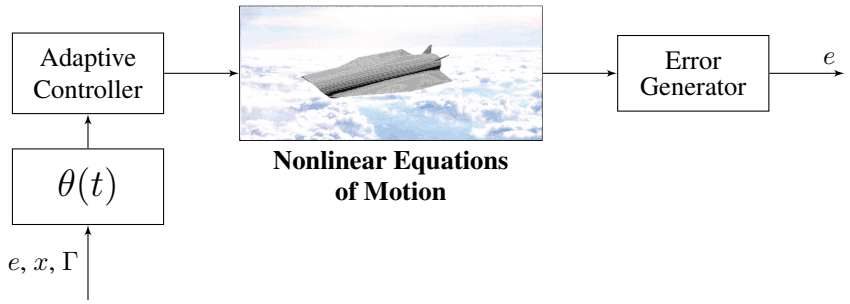
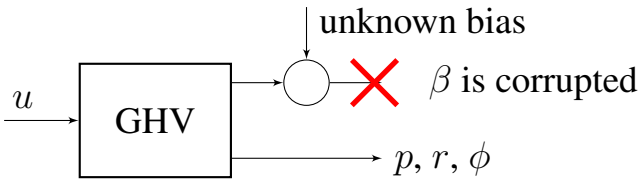


Figure 12: Baseline plus adaptive control block diagram

Block



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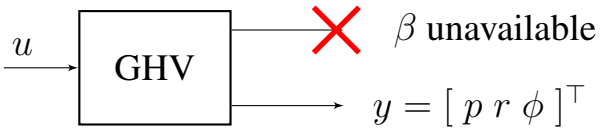

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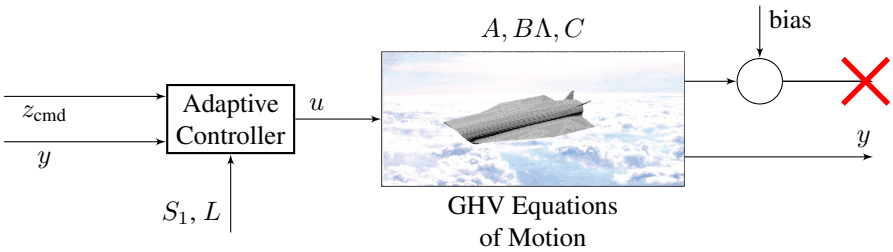

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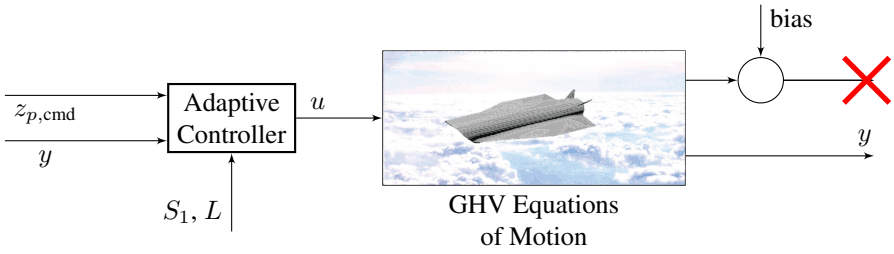

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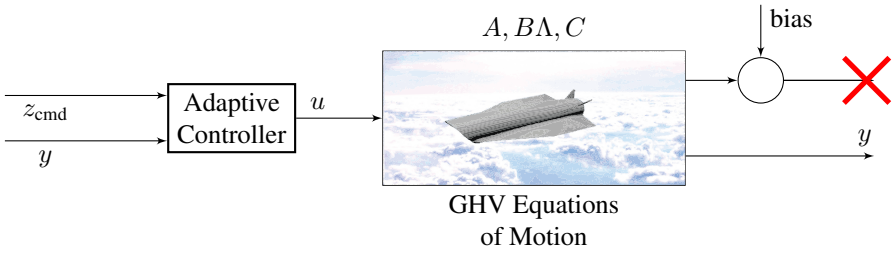

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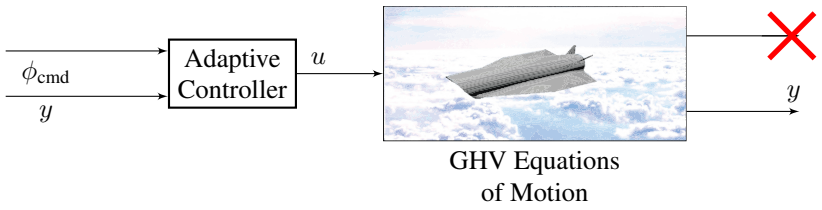
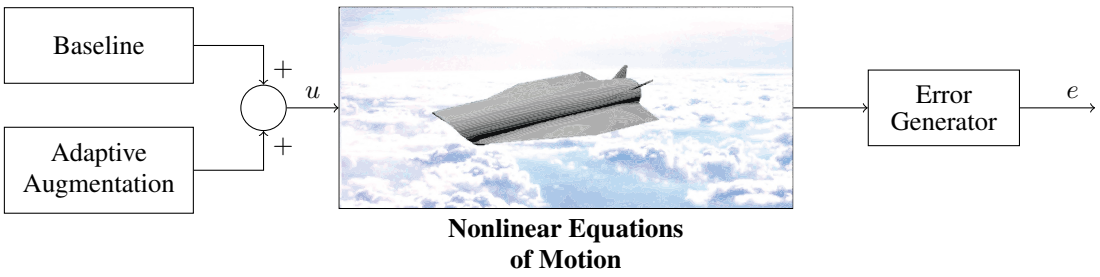
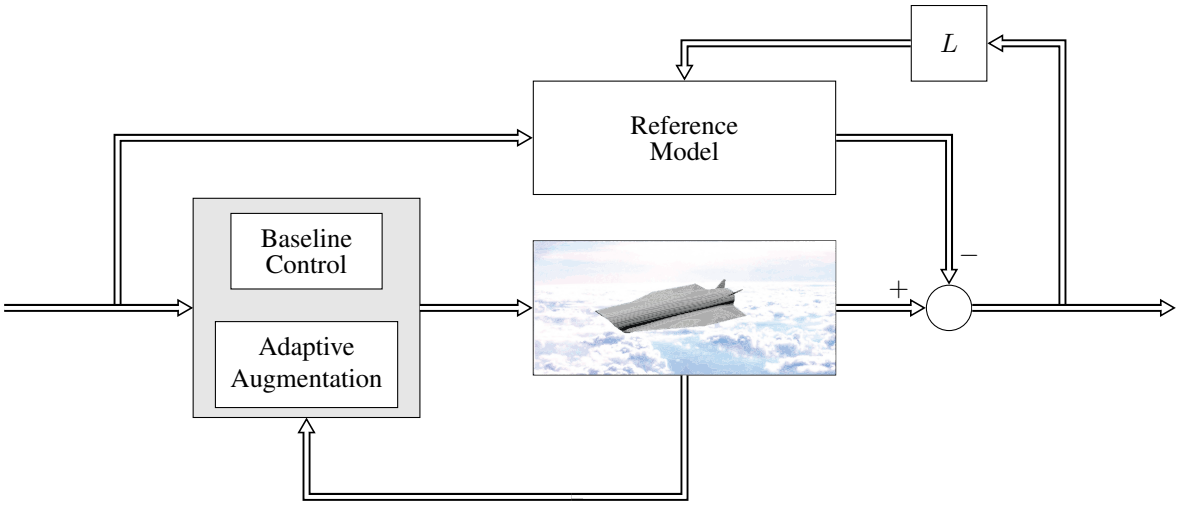
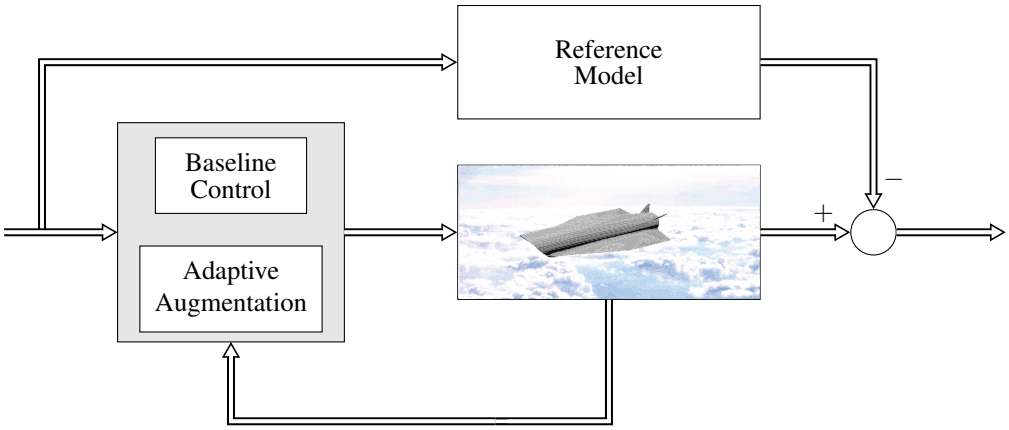
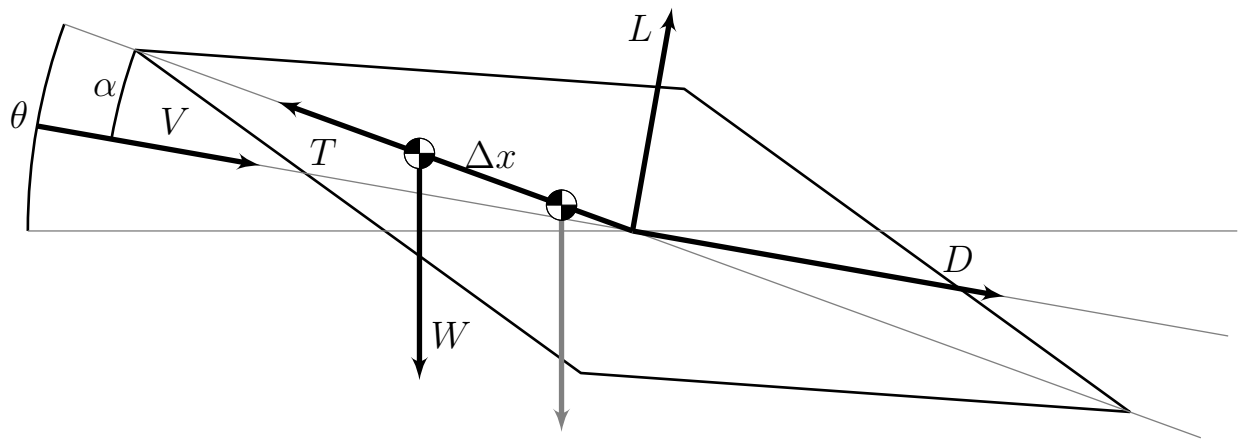
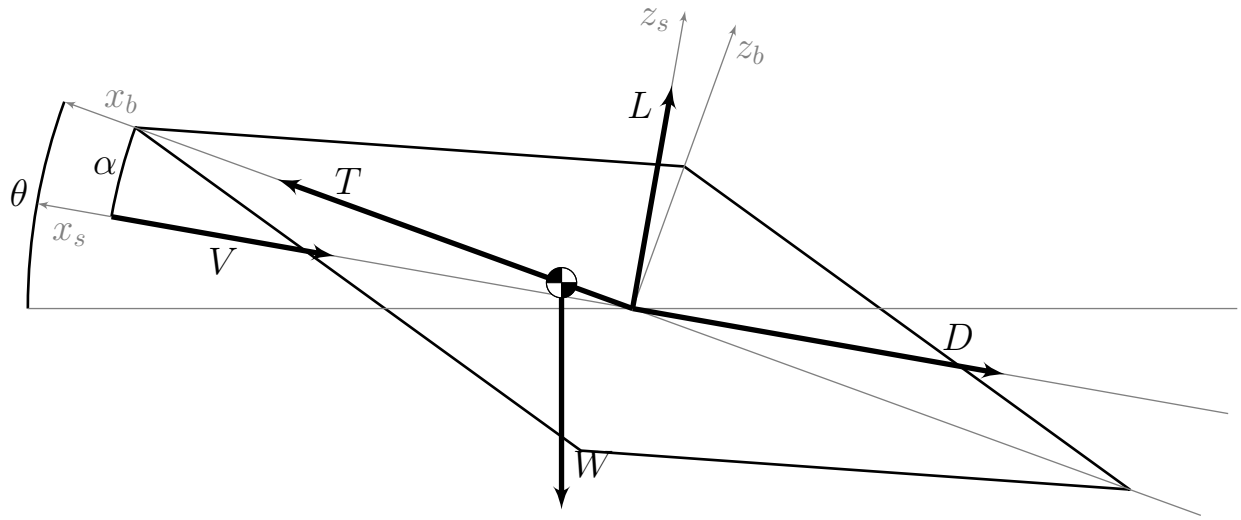


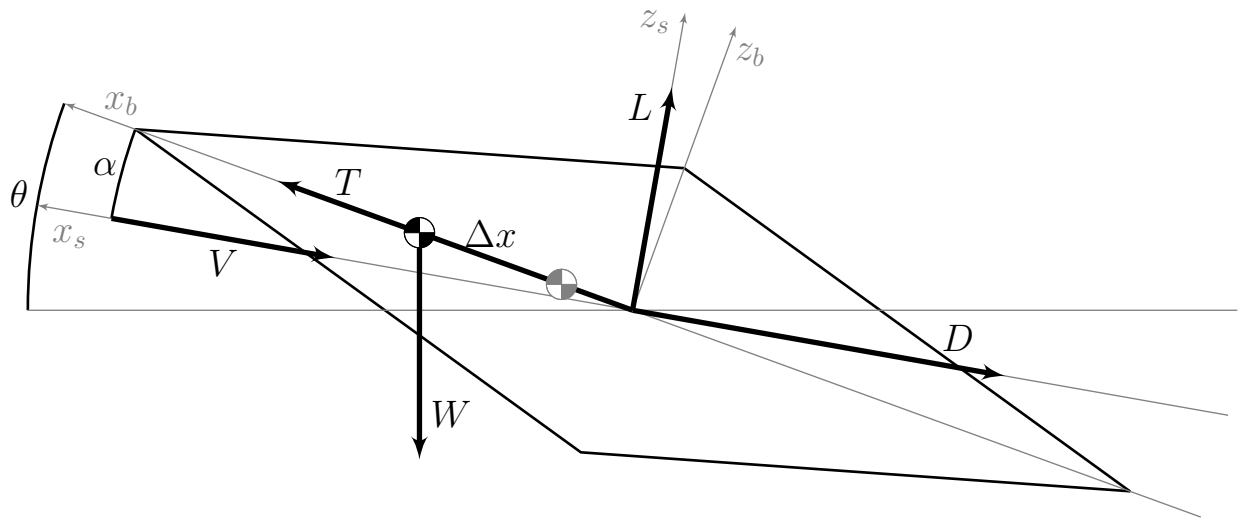


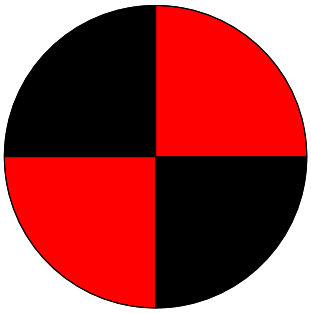

L
Reference
Model
Baseline
Control
Adaptive
Augmentation
+
−

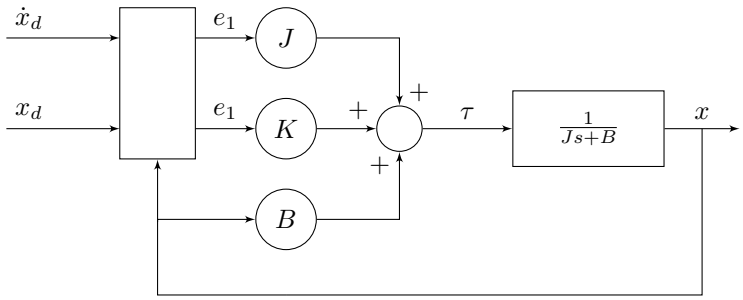

Reference
Model
Baseline
Control
Adaptive
Augmentation
+
−


L
α
θ
V
T
Δx
D
W


z_s
z_b
x_b
L
α
T
θ
x_s
V
D
W


z_s
z_b
x_b
L
α
T
θ
Δx
x_s
V
D
W




$\dot{x}_d$
x_d
e_1
e_1
J
K
B
+
+
+
τ
$\frac{1}{Js+B}$
x

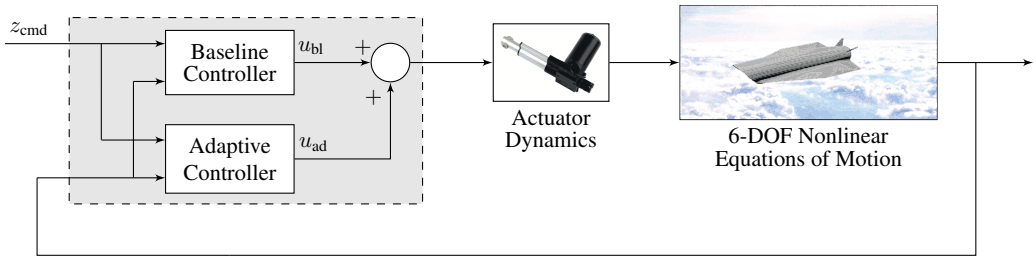
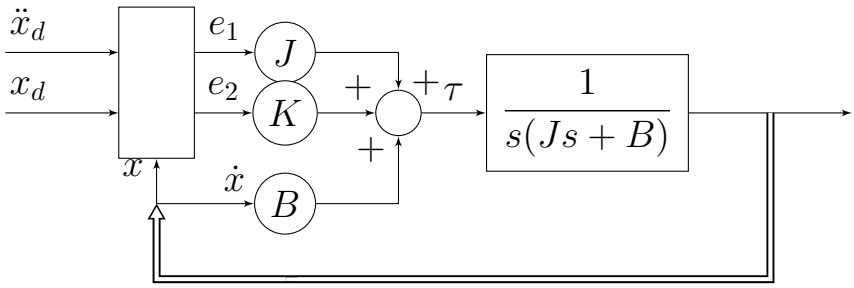
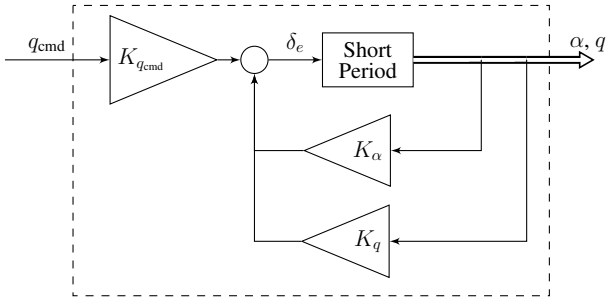
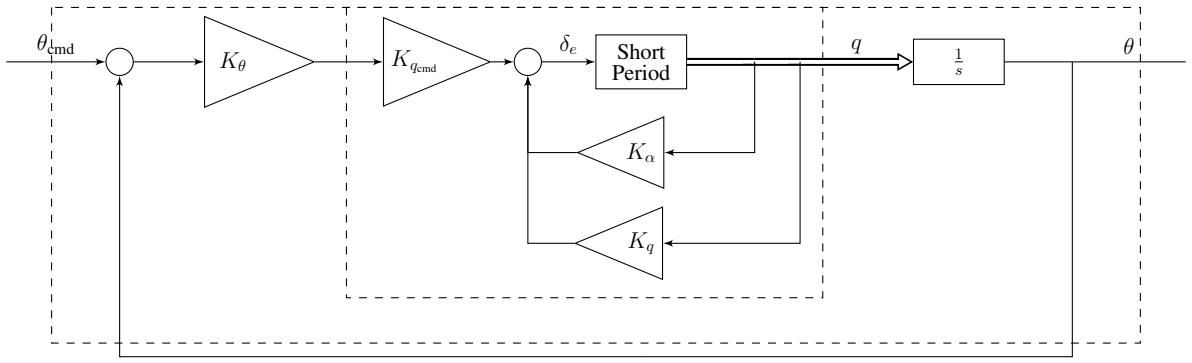


Figure 13: Baseline plus adaptive control block diagram


$\ddot{x}_d$
x_d
x
e_1
e_2
J
K
B
$\dot{x}$
$+$
$+$
$+\tau$
$\frac{1}{s(Js+B)}$


q_{cmd}
$K_{q_{\text{cmd}}}$
δ_e
Short
Period
α, q
K_α
K_q


θ_{cmd}
K_θ
$K_{q_{\text{cmd}}}$
δ_e
Short
Period
q
$\frac{1}{s}$
θ
K_α
K_q