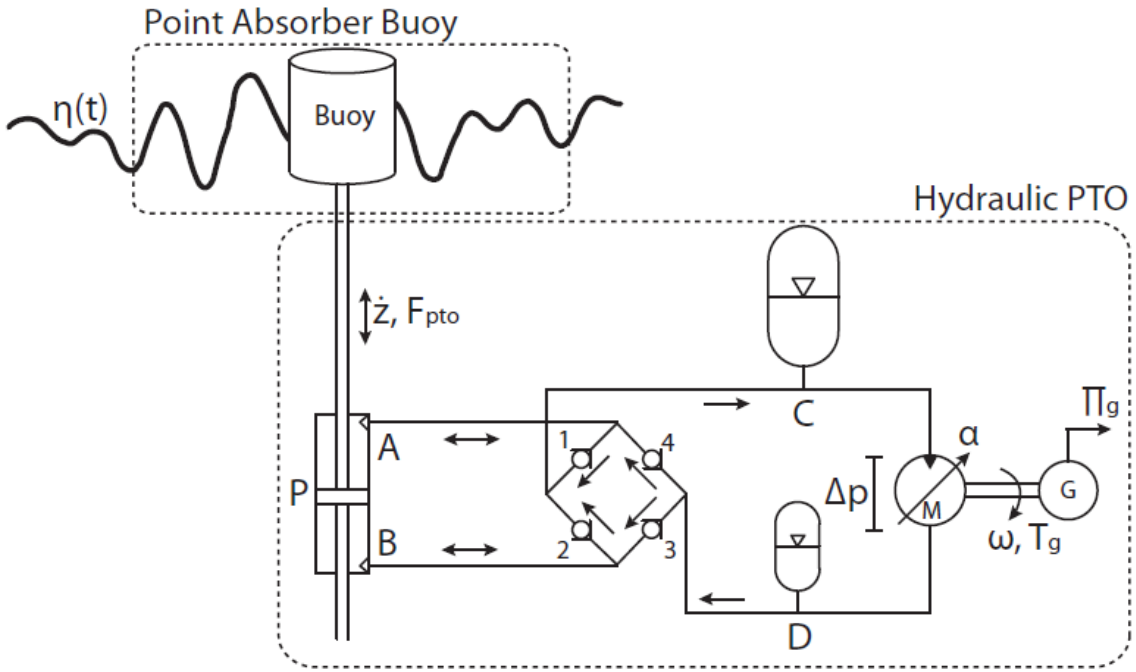
Goals for today

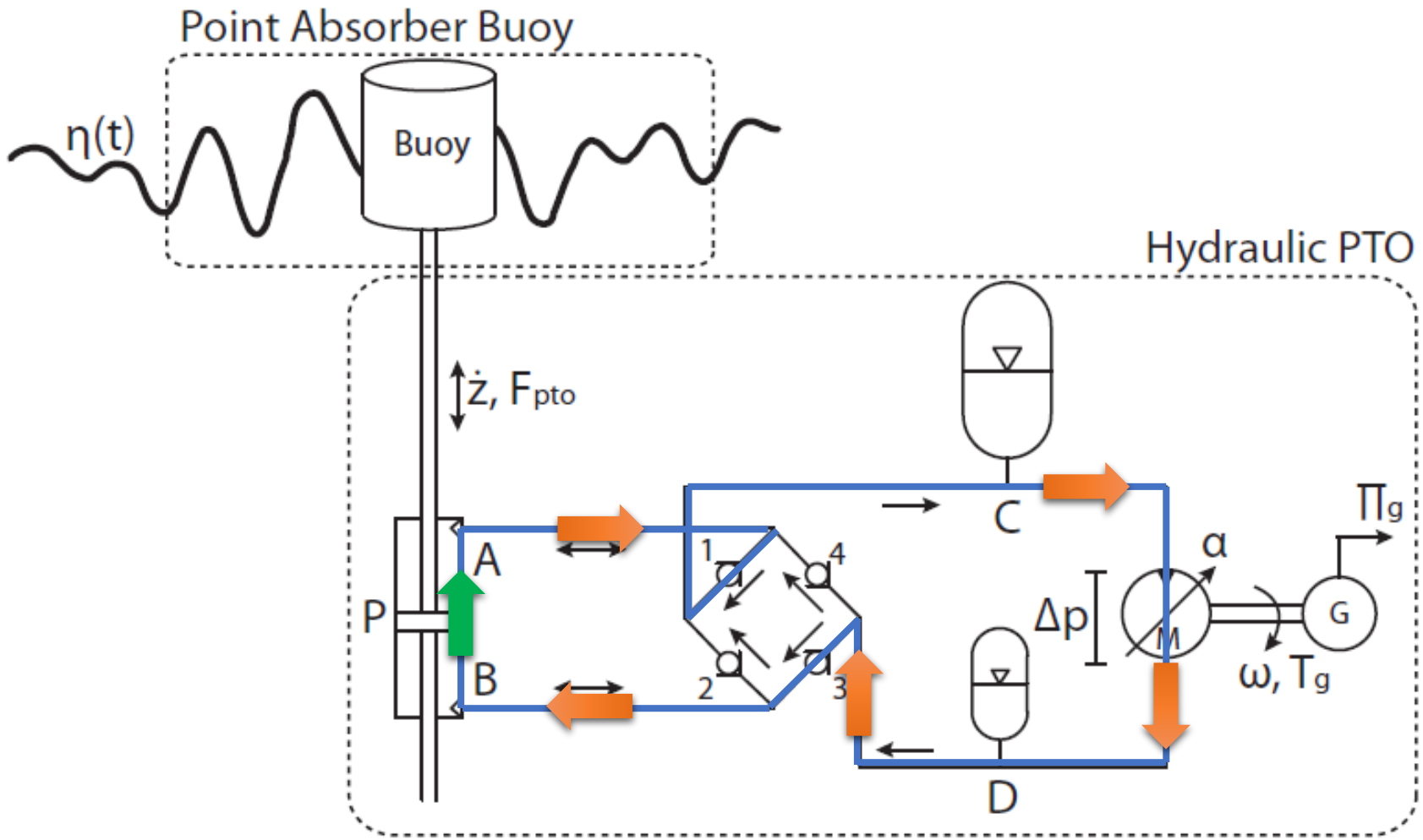
- This Week Updates
- Progress made on Passive Hydraulic PTO (Sean’s Model)
- Discussions and Questions
- Next Steps

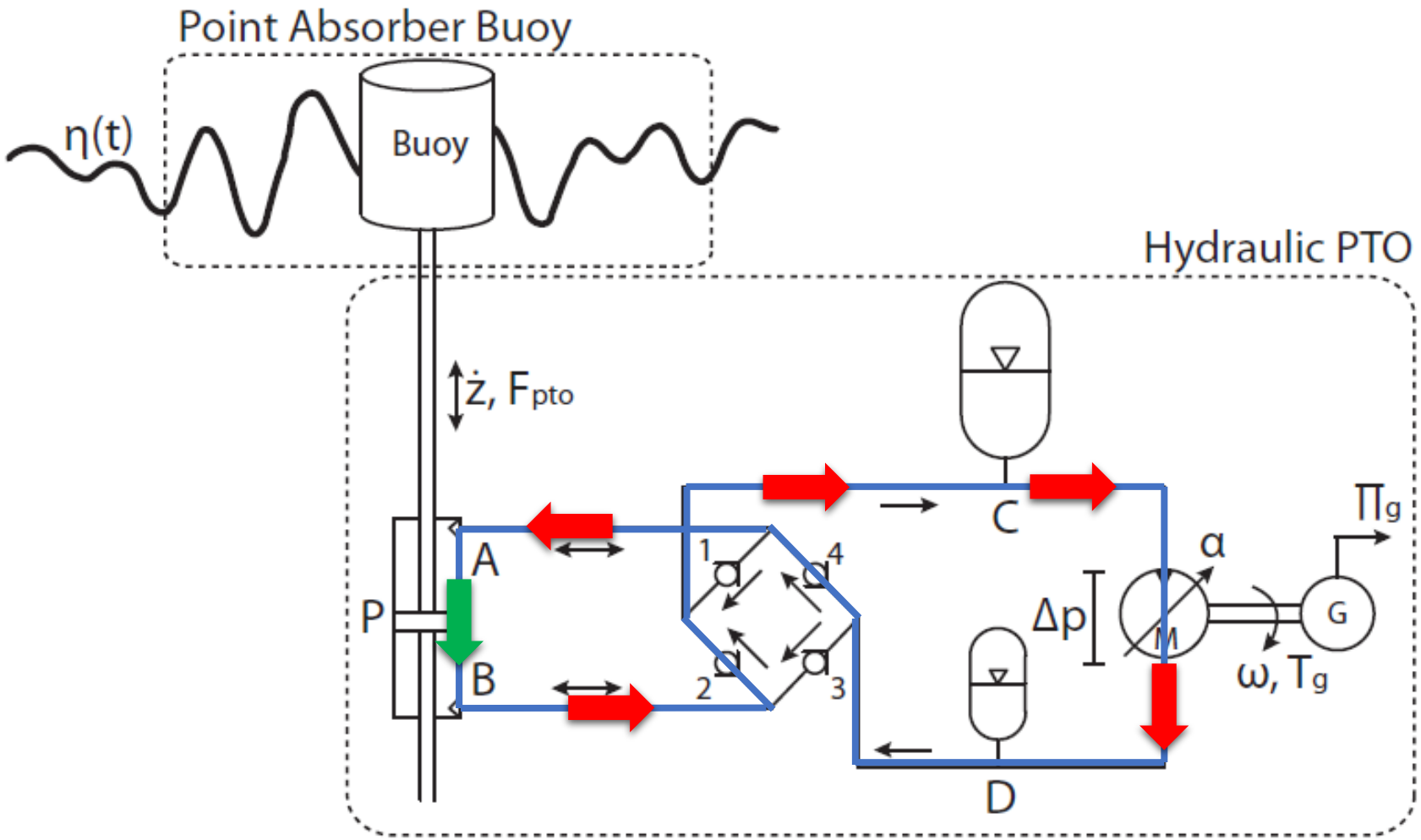
Passive Hydraulic PTO

- A double acting hydraulic piston pump
- Bidirectional flow
- HP accumulator stores hydraulic energy and smooths the flow across the motor
- A variable displacement motor
- A torque balance on the motor

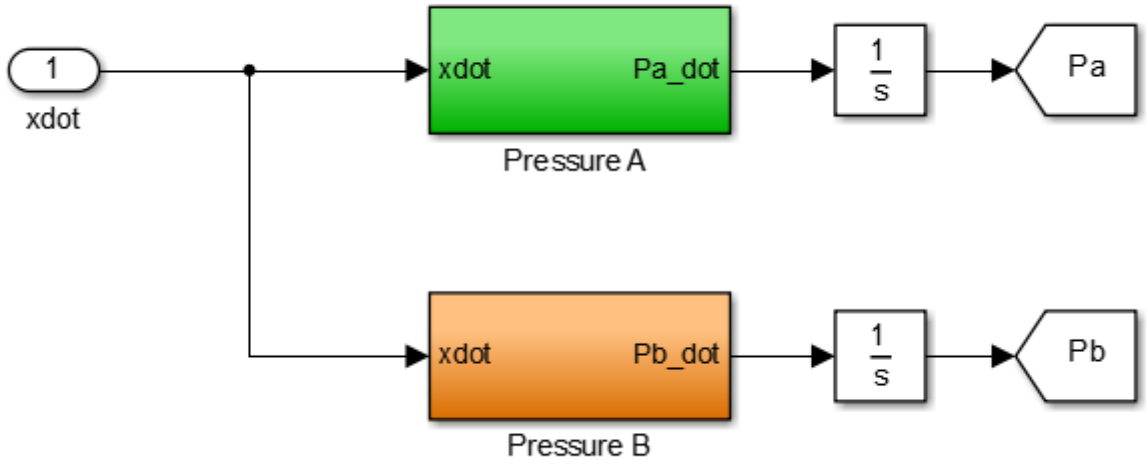
and generator



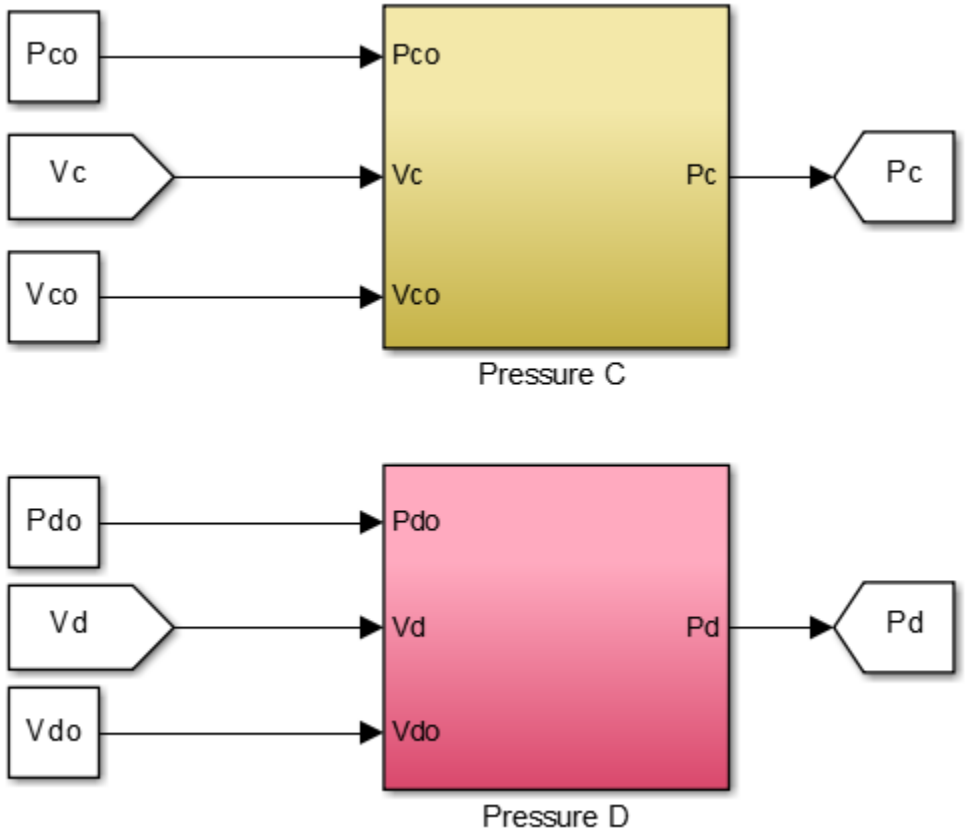

Point Absorber Buoy
η(t)
Buoy
Hydraulic PTO
ż, F_pto
P
A
B
1
2
3
4
C
D
Δp
α
M
G
ω, T_g
Π_g


Point Absorber Buoy
η(t)
Buoy
Hydraulic PTO
ż, F_pto
A
B
P
1
2
3
4
C
D
Δp
α
M
G
ω, T_g
Π_g

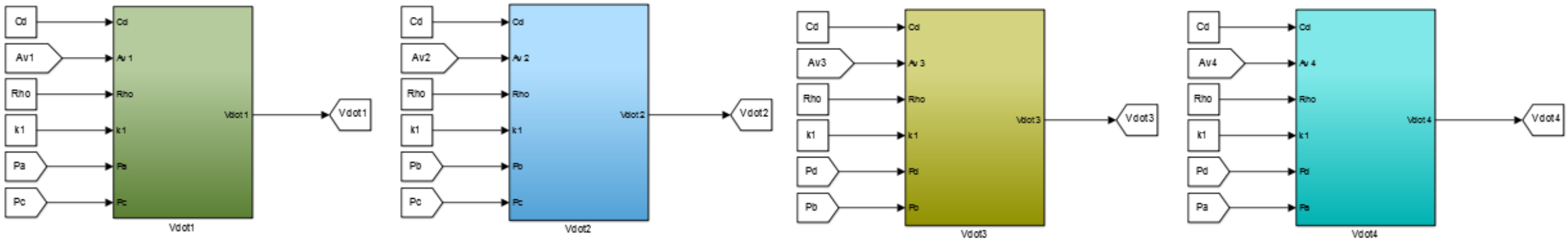
Pressures at A and B



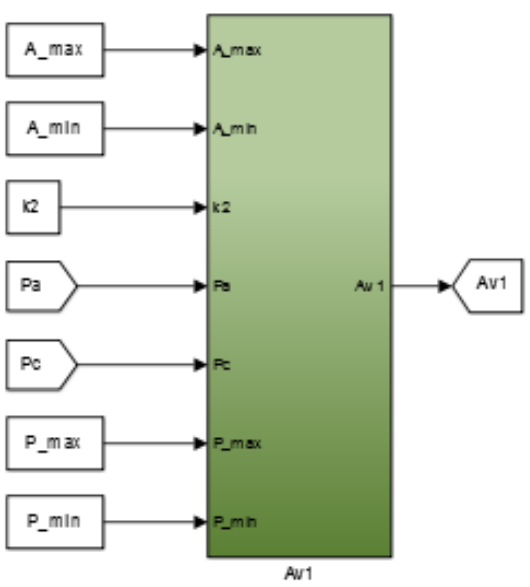
Pressures at C and D

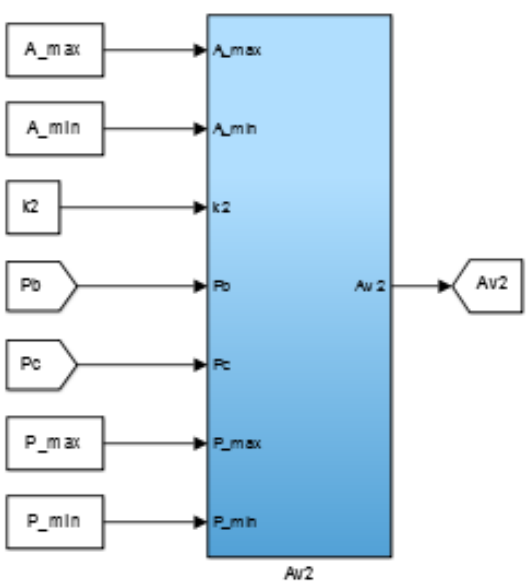


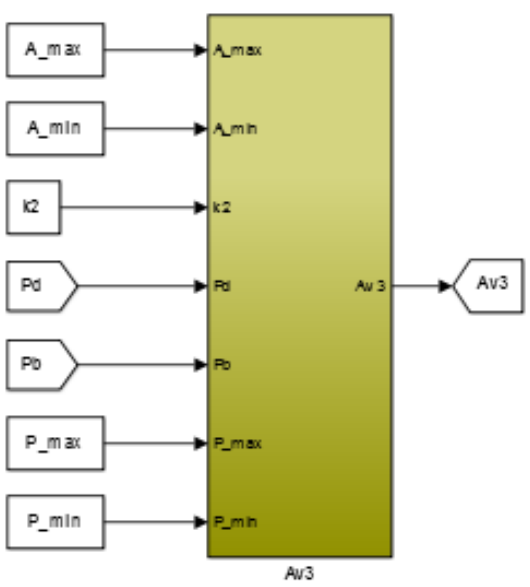
Volumetric Flow: $\dot{V}_i$

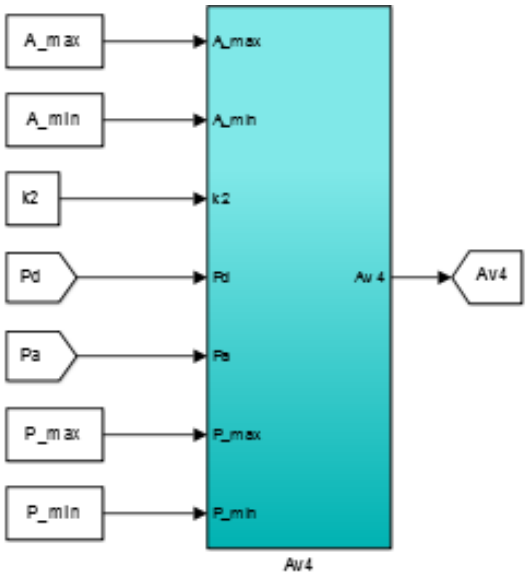


Valve area: A_v





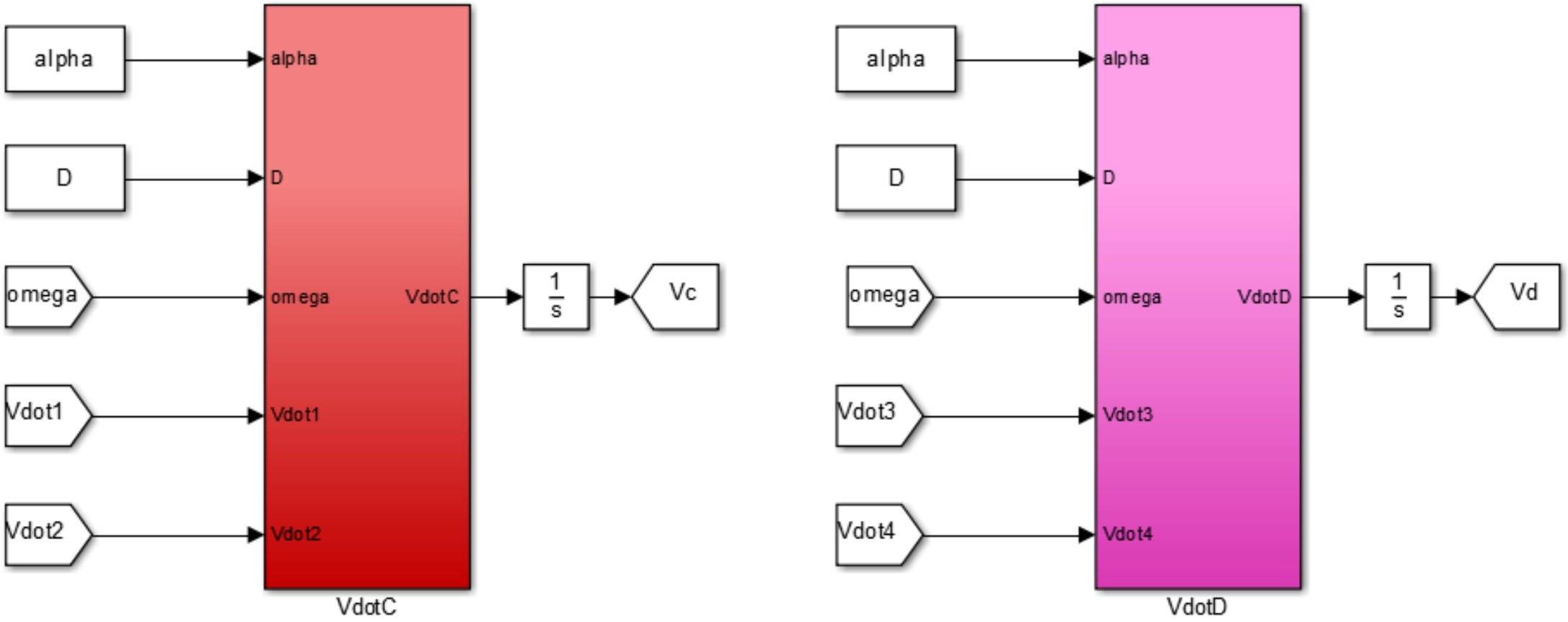




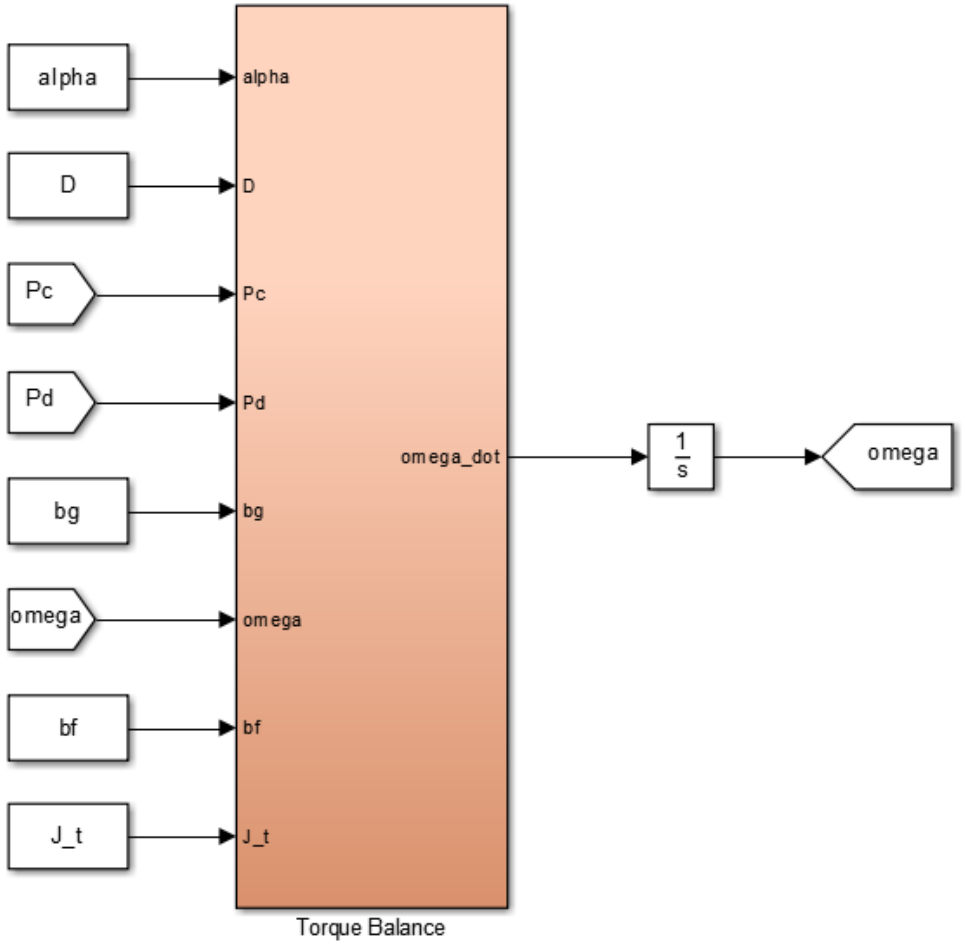
$$A_v = \frac{A_{max} - A_{min}}{2} + A_{min} + \frac{A_{max} - A_{min}}{2} \tanh \quad k_2 \quad (p_j - p_k) - \frac{p_{max} + p_{min}}{2}$$

$$A_v = A_{min} \iff p_j - p_k = p_{min}$$

The Flow Into Accumulator “C” and “D”



State Equation for a Torque Control



Motor moment of inertial (J_t) = 0.061

Motor displacement (D) = 250 cm^3