Example Answers

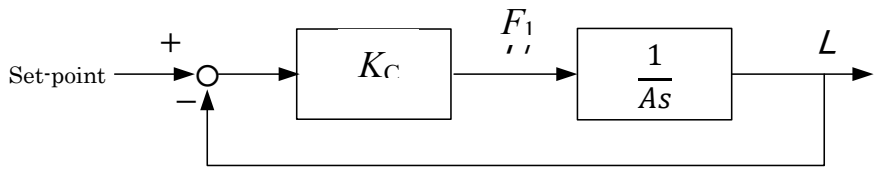
International Master's Programs of Chemical Engineering in the Graduate School of Engineering, Kyushu University (Academic Year from October, 2025)

Subject： Process Control（1 sheet）

(1.1) $A\dfrac{dL}{dt} = F_1 - F_2$

(1.2) $G_P(s) = \dfrac{1}{As}$

(1.3)

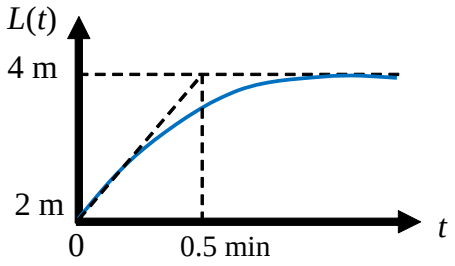


$$G_0(s) = \frac{K_C}{As}$$

(1.4) $1 + \dfrac{K_C}{As} = 0 \quad \therefore \quad s = -2 < 0$

(1.5) $f(t) = 1 - e^{-2t}$

(1.6)



(1.7) P control offers simplicity and quick response but cannot eliminate steady-state errors, making it suitable for systems where offset is acceptable. PI control addresses the steady-state error issue but may introduce complexity in tuning and slower system response, making it preferable for systems where eliminating offset is critical.