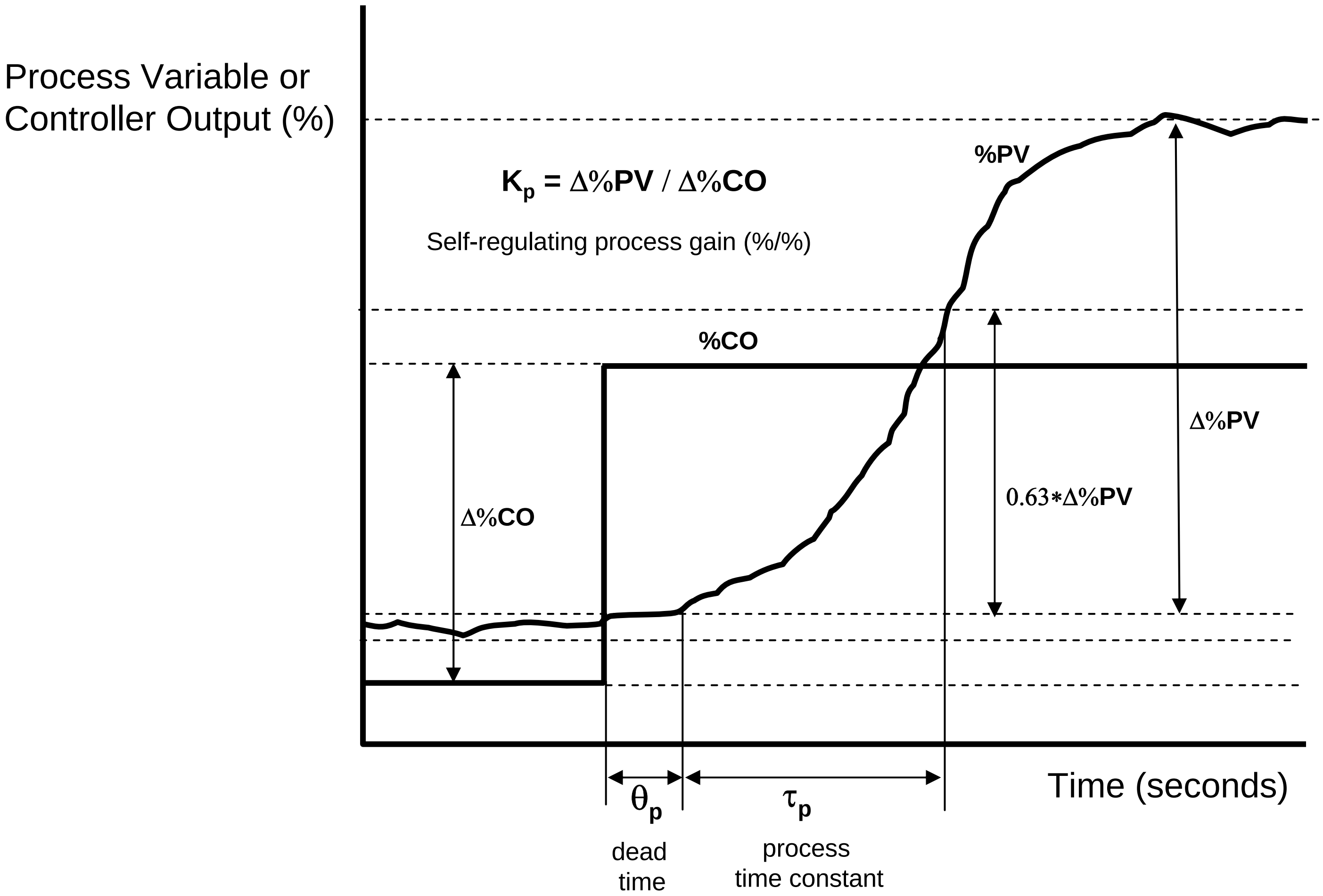
Self-Regulating Process



Lambda (closed loop time constant) is defined in terms of a Lambda factor (λ_f):

$$\lambda = \lambda_f * \tau_p$$

Self-Regulating Process

Self-Regulation Process Gain:

$$K_p = \frac{|\Delta\%PV|}{|\Delta\%CO|}$$

Controller Gain

$$K_c = \frac{T_i}{K_p * (\lambda_f * \tau_p + \theta_p)}$$

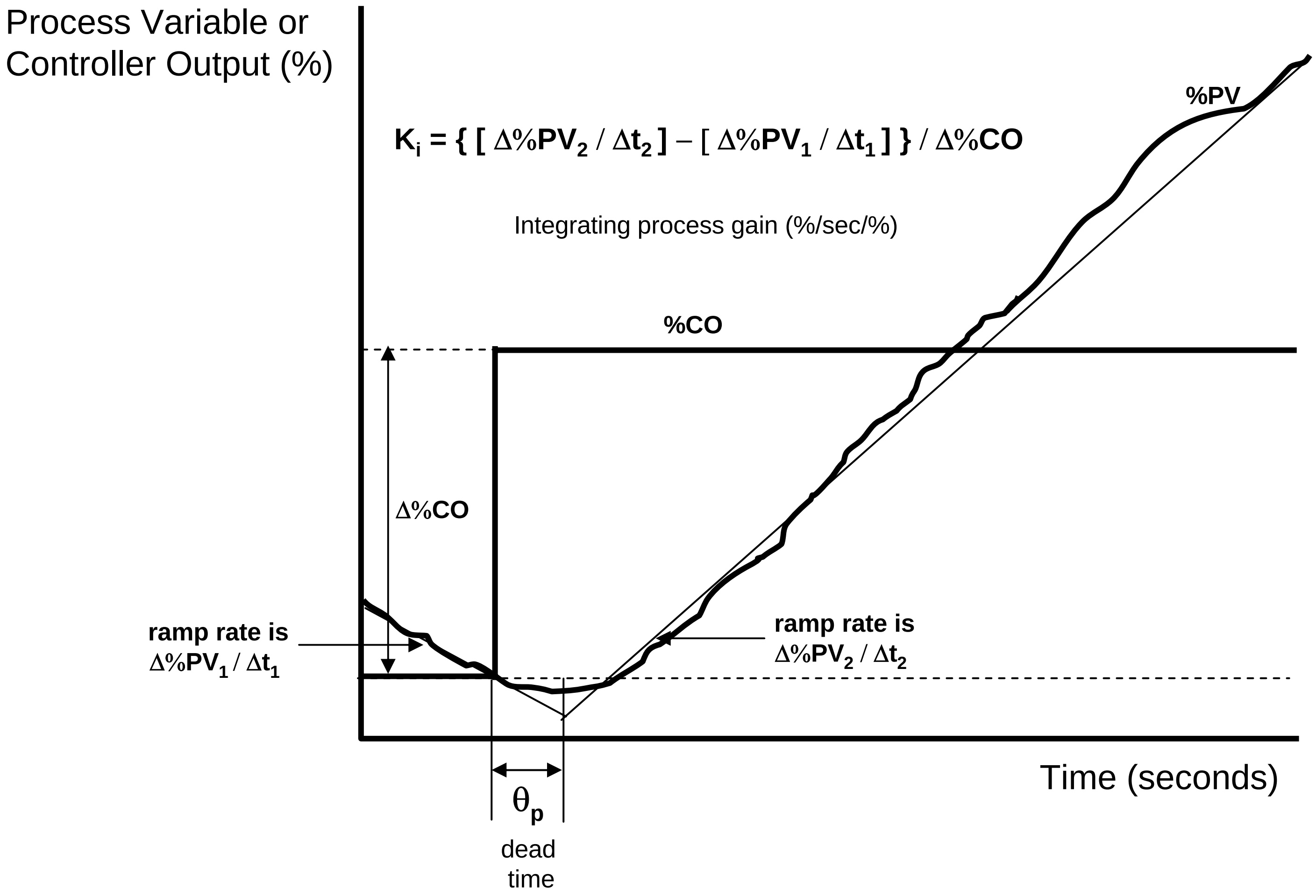
Controller Integral Time

$$T_i = \tau_p$$

“Near Integrating” Gain Approximation

$$K_i = \frac{K_p}{\tau_p}$$

Integrating Process



Lambda (closed loop arrest time) is defined in terms of a Lambda factor (λ_f):

$$\lambda = \lambda_f \; / \; K_i$$

Integrating Process

Integrating Process Gain:

$$K_i = \frac{\left| \Delta\%PV_2 / \Delta t_2 - \Delta\%PV_1 / \Delta t_1 \right|}{\left| \Delta\%CO \right|}$$

Controller Gain

$$K_c = \frac{T_i}{K_i * [(\lambda_f / K_i) + \theta_p]^2}$$

Controller Integral Time

$$T_i = 2 * (\lambda_f / K_i) + \theta_p$$

The above tuning automatically insures the following inequality is satisfied to prevent slow rolling oscillations from too low of a gain or integral time.

$$K_c * T_i > \frac{4}{K_i}$$