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Synthesis of PID Tuning Rule Using the Desired Closed-Loop Response. Rames C. Panda*

With reference to our paper entitled "Synthesis of PID Tuning rule Using the Desired Closed-Loop Response" the author's request following corrections:

Table 1, row 4, the PID controller parameters for IPDT type of process

$$G_P(s) = \frac{K_P e^{-Ds}}{\tau_P s(as + 1)}$$

will be

$$K_C = \frac{\tau_P}{K_P(\tau_P + a + 2\lambda + D)}$$

$$\tau_I = (\tau_P + a + 2\lambda + D) + \frac{D^2(2\lambda + D)}{(\tau_P + a + 2\lambda + D)} + \beta$$

$$\tau_D = \frac{(\tau_P + a)(2\lambda + D) + \dfrac{(C_2 C_0 - 0.5C_3)}{C_1} + \dfrac{C_2^2}{C_1^2} + \dfrac{\beta(C_0 + C_2/C_1)}{K_P C_1}}{K_C}$$

where

$$C_0 = \tau_P + a + 2\lambda + D; \quad C_1 = \lambda^2 + 2\lambda + 0.5D; \quad C_2 = D^2\left(2\lambda + \frac{2}{3}D\right); \quad C_3 = D^3\left(2\lambda + \frac{3}{4}D\right)$$

But as τ_D involves higher orders of time-delay terms, it may give high values of derivative gains especially for large (D/τ_P) processes. Hence, judicially, τ_D is found by equating coefficients of s terms of $G_C(s)$ with the same of the right-hand side of $\phi(s)$ where

$$\phi(s) = G_C(s) = \frac{\tau_P(2\lambda + D)s^2 + (\tau_P + 2\lambda + D)s + 1}{K_P(\lambda + D)^2}$$

and thereby

$$\tau_D = \frac{\tau_P(2\lambda + D)}{K_P(\lambda + D)^2}$$

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