$\underline{\underline{LF}}$

$$x_k^c(t) = \int_0^\infty du\, p(u)\, x_k^{PD}(t-u) \xrightarrow{\mathcal{L}} \dot{x}_k^c(t) = \frac{1}{b}\left\{x_k^{PD}(t) - x_k^c(t)\right\} + \delta(t)\, x_k^c(0)$$

$$p(u) = u^{a-1} \frac{e^{-u/b}}{b^a\, \Gamma(a)} \xrightarrow{\mathcal{L}} p(\lambda) = (1 + b\lambda)^{-a}$$

integration time

$\tau = ab = RC$

$$x_k^c(t+dt) - x_k^c(t) = \frac{dt}{b}\left\{x_k^{PD}(t) - x_k^c(t)\right\} + dt\, \delta(t)\, x_k^c(0)$$

$\downarrow$

$$x_k^c(t+dt) = \underbrace{\frac{dt}{b}}_{= dt\,\omega_c} x_k^{PD}(t) + \Big(-\underbrace{\frac{dt}{b}}_{= dt\,\omega_c} + 1\Big)\, x_k^c(t)$$

from RC circuitry

$$f_c = \frac{1}{2\pi RC}$$

$$\omega_c = \frac{1}{RC} = \frac{1}{ab} = \frac{1}{\tau}$$

hence in rad Hz