$$T_{ON} = \frac{1}{K_{ON} C_{A0}(\alpha - 1)} \ln \left[\frac{\alpha - x}{\alpha(1-x)} \right]$$

Now conversion $= Y$

$$r = K_{off} C_A C_B \qquad C_{new} = C_{A0}(1-x)$$

$$\left(\frac{dC_A}{dt}\right) = K_{off} C_{A_{new}}(1-Y)\left(C_{B_{new}} - C_{A0}x - C_{A_{new}} Y\right)$$

$$\frac{dY}{dt} = K_{off} C_{A0}(1-x)(1-y)\left(\frac{C_{B0} - C_{A0}x}{C_{A0}(1-x)} - y\right)$$

$$\frac{dy}{(1-y)\left(\frac{C_{B0} - C_{A0}x}{C_{A0}(1-x)} - y\right)} = \int_0 dt \left(K_{off} C_{A0}(1-x)\right)$$

Integration both sides

& simpifying for T_{off}

$$T_{off} = \frac{1}{(\alpha - 1)(C_{A0}(1-x))} \ln\left(\left(\frac{\alpha - Y}{\alpha - x}\right)\frac{(1-x)}{1-y}\right)$$

$$T_{total} = T_{ON} + T_{off} + T_{ON} + - T_{off}$$

→ using this result we can generalise for ~~other~~ next Ton & Toff