⑤

A	f_{A_0}	$-f_{A_0}\frac{X}{2}$	$f_{A_0}(1-X)$
B	0	$f_{A_0}\frac{X}{2}$	$f_{A_0}\frac{X}{2}$.
C	f_{C_0}	0	f_{C_0}

* assumed inital v_0 as constant

Case I $\quad f_{T_0} = 2f_{A_0} \quad f_A \to f_{A_0} \cdots \to 0.2f_{A_0}$

case II $\quad f_{T_0} = \frac{3}{2}f_{A_0}. \quad f_A \to 0.5f_{A_0} \to ?$

$$f_T = f_{A_0} + f_{C_0} - f_{A_0}\frac{X}{2}$$

$$f_T = f_{T_0} - \frac{f_{A_0}}{2f_{A_0}}(f_{A_0} - f_A)$$

$$f_T = f_{T_0} - \frac{f_{A_0}}{2} + \frac{f_A}{2}.$$

$$\frac{f_T}{f_{T_0}} = \left(1 - \frac{f_{A_0}}{2f_{T_0}}\right) + \frac{f_A}{2f_{T_0}}$$

$$v = v_0\left[\left(1 - \frac{f_{A_0}}{2f_{T_0}}\right) + \frac{f_A}{2f_{T_0}}\right]$$

$$\cancel{\int_{0.2f_{A_0}}^{f_{A_0}} \frac{\left(\frac{3}{4} + \frac{f_A}{4f_{A_0}}\right)^2}{f_A} df_A} = \cancel{\int_{0.8f_{A_0}}^{f} \frac{\left(\frac{2}{3} + \frac{f_A}{3f_{A_0}}\right)^2}{f_A} df_A}$$

$$\frac{df_A}{dV} = \frac{-KC_A^2 \cdot v^2}{v_0^2\left[\left(1 - \frac{f_{A_0}}{2f_{T_0}}\right) + \frac{f_A}{2f_{T_0}}\right]^2}$$

$$\int_{0.2f_{A_0}}^{f_{A_0}} \frac{\left(\frac{3}{4} + \frac{f_A}{4f_{A_0}}\right)^2}{f_A} df_A = \int_{f}^{0.5f_{A_0}} \frac{\left(\frac{5}{6} + \frac{f_A}{3f_{A_0}}\right)^2}{f_A} df_A$$

$$f \approx 0.187 f_{A_0}$$

$$\frac{df_A}{dV} = \frac{-Kf_A^2}{v_0^2\left[\left(1 - \frac{f_{A_0}}{2f_{T_0}}\right) + \frac{f_A}{2f_{T_0}}\right]^2}$$

$$X = \frac{0.5f_{A_0} - 0.187f_{A_0}}{0.5f_{A_0}} = 0.626$$

62.6 % conversion.

$$\frac{v_0^2}{K}\int\left[\frac{\left(1 - \frac{f_{A_0}}{2f_{T_0}}\right) + \frac{f_A}{2f_{T_0}}}{f_A}\right]^2 df_A = -\int dV$$

equating this for I & II