$A \xrightarrow{k_1} X \xrightarrow{k_2} Z$ | At $t=0$, $[A]_0 = [A]_0$

$$[A] = [A]_0 e^{-k_1 t}$$

$$[X] = [A]_0 \frac{k_1}{k_2 - k_1} \left(e^{-k_1 t} - e^{-k_2 t}\right)$$

The equation for the variation of $[Z]$ can be obtained by nothing that $[A] + [X] + [Z] = [A]_0$

So that $[Z] = [A]_0 - [A] - [X]$

Insertion of the expressions for $[A]$ and $[X]$ in the eq. of $[Z]$ leads to

$$[Z] = [A]_0 - [A]_0 e^{-k_1 t} - [A]_0 \frac{k_1}{k_2 - k_1}\left(e^{-k_1 t} - e^{-k_2 t}\right)$$

$$= [A]_0 \left\{ 1 - e^{-k_1 t} - \frac{k_1}{k_2 - k_1}\left(e^{-k_1 t} - e^{-k_2 t}\right) \right\}$$

$$= [A]_0 \left\{ \frac{k_2 - k_1 - (k_2 - k_1) e^{-k_1 t} - k_1 e^{-k_1 t} + k_1 e^{-k_2 t}}{k_2 - k_1} \right\}$$

$$= \frac{[A]_0}{k_2 - k_1} \left\{ k_2 - k_1 - k_2 e^{-k_1 t} \cancel{+ k_1 e^{-k_1 t}} \cancel{- k_1 e^{-k_1 t}} + k_1 e^{-k_2 t} \right\}$$

$$= \frac{[A]_0}{k_2 - k_1} \left\{ k_2 \left(1 - e^{-k_1 t}\right) - k_1 \left(1 - e^{-k_2 t}\right) \right\}$$