

$$N_2(t) = N_2(0) e^{-A_{21}t}$$

The τ definition is written in the book like follows:

$$\tau = \frac{1}{N_2(0)} \int_0^{\infty} A_{21} N_2 t dt$$

Where did he brought the previous relation from??????

And then he continued to solve the integral this way, to define that τ is the inverse of A_{21} so we can't say he used the relation in the first line in this document to figure the τ relation !!!

$$\tau = \int_0^{\infty} A_{21} \left(\frac{N_2}{N_2(0)} \right) t dt = \int_0^{\infty} A_{21} e^{-A_{21}t} t dt$$

$$\tau = \frac{1}{A_{21}}$$

The question is mentioned in the second text line ...

Thank you for reading