# Chapter 1 Comp Notes

If $N_U(t)$ = number of uranium nuclei that are present in the sample at time $t$, then this diff eq represents its behavior

$$\frac{dN_U}{dt} = -\frac{N_U}{\tau}$$ $\tau$ = "time constant"

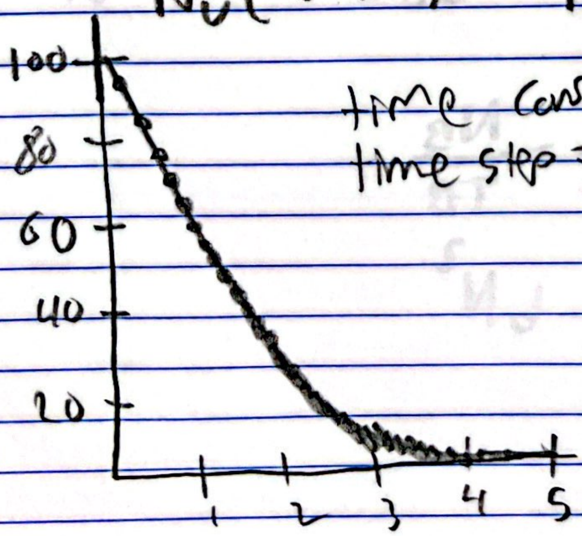
$$N_U = N_U(0)e^{-t/\tau}$$

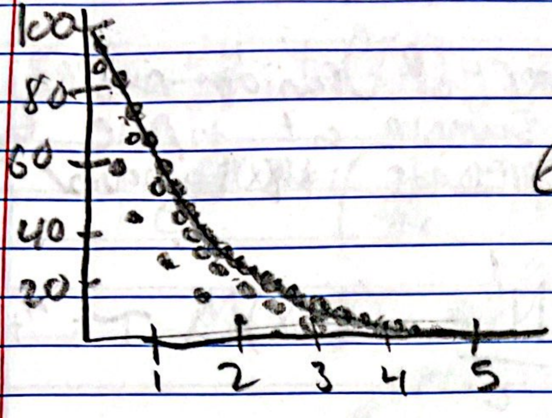
Taylor expansion for $N_U$

$$N_U(\Delta T) = N_U(0) + \frac{dN_U}{dt}\Delta t + \frac{1}{2}\frac{d^2N_U}{dt^2}(\Delta t)^2$$

Assuming $\Delta t$ is small rearrange to be:

$$N_U(t+\Delta t) \approx N_U(t) + \frac{dN_U}{dt}\Delta t$$






Shows how different time steps affects the cur

$dt1 = 0.5s$
$dt2 = 0.2s$
$dt3 = 0.05s$

- Program Structure:
- Use descriptive names:
- Use comment statements
- Sacrifice for clarity - (Compact yet clear)
- Clear graphical output

$$\frac{dV}{dt} = -g \qquad \frac{dx}{dt} = V \qquad \frac{dv}{dt} = a - bv$$

$$\frac{dN_B}{dt} = \frac{N_A}{T_A} - \frac{N_B}{T_B}$$

$$\frac{dN}{dt} = aN - bN^2$$