Ch 1 Notes

$$\frac{dN_U}{dt} = -\frac{N_U}{\tau} \longrightarrow N_U = N_U(0)e^{-t/\tau}$$

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

Taylor expansion of N_U

let Δt be small $N_U(\Delta t) \approx N_U(0) + \frac{dN_U}{dt}\Delta t$

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

$$N_U(t+\Delta t) \approx N_U(t) - \frac{N_U(t)}{\tau}\Delta t$$

Can use this to predict N for future time values by estimating how N will change for increments of Δt (step values)

Declare necessary variables + arrays
initialize variables (initialize function)
do calculation (calculate function)
store results

initialize function

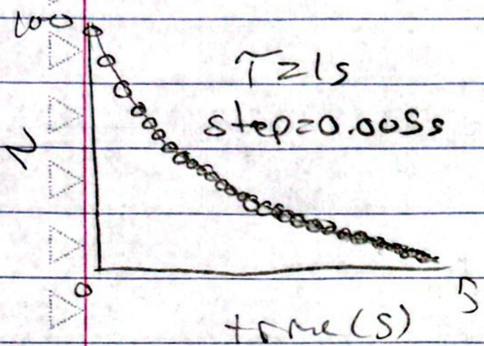
Prompt & assign $N_U(0)$, τ, Δt

Set initial value of time

Set number of time steps (tmax/dt)

$N_U(t_{i+1}) = N_U(t_i) - (N_U(t_i)/\tau)\,dt \qquad t_{i+1} = t_i + \Delta t$

↳ use for loop in calculate function



As step gets small numerical solution gets very close to exact solution. (line = exact circle = numerical)

Use subroutines to organize tasks

Use descriptive function names

Use comment statements throughout

Clarity is most important

Make sure graphs are as clear as possible