

Problem 1

False, it is not always better to choose a smaller Δt .

While, it is necessary that Δt be small enough to capture the dynamics of the system, and produce an accurate result, a Δt too small can cause issues. Aside from some numerical problems that may arise from a Δt that is too small, the primary issue is that of computational time. Since computational time is proportional to the number of steps (N), and smaller Δt requires more steps, it is easy to see that for a sufficiently small Δt the computational time can be too much for the machine to handle.

Example: Euler Method

Global error: $O(\Delta t)$

* A balance must be struck between accuracy and

Steps: $N = \frac{T}{\Delta t}$ comp. time