

WISB134

Modellen & Simulatie

Lecture 3 - Numerieke methoden



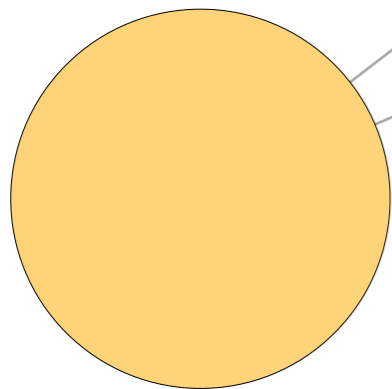
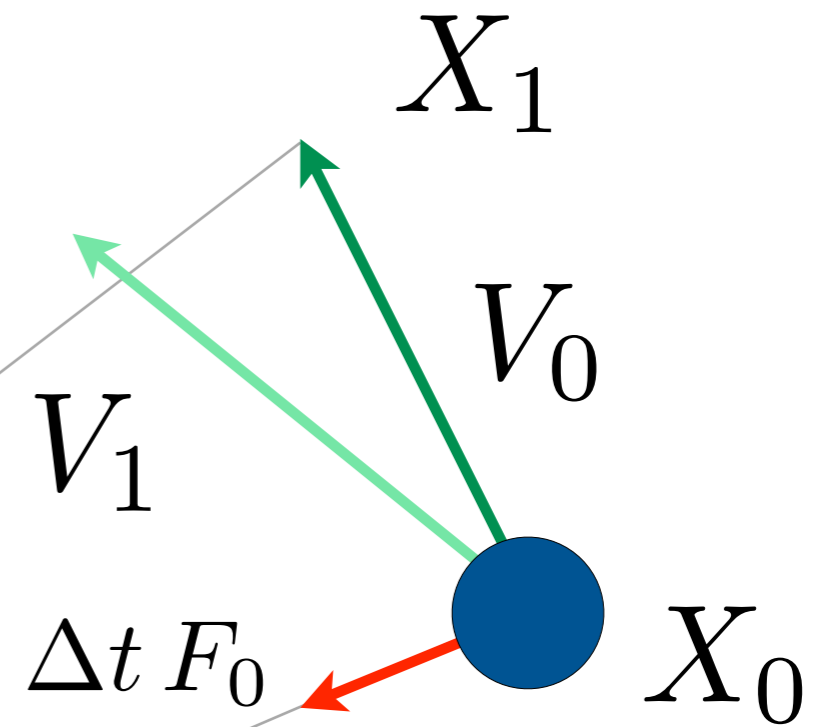
Universiteit Utrecht

Numerieke methoden

Methode van Euler



Leonhard Euler (1707-1783)

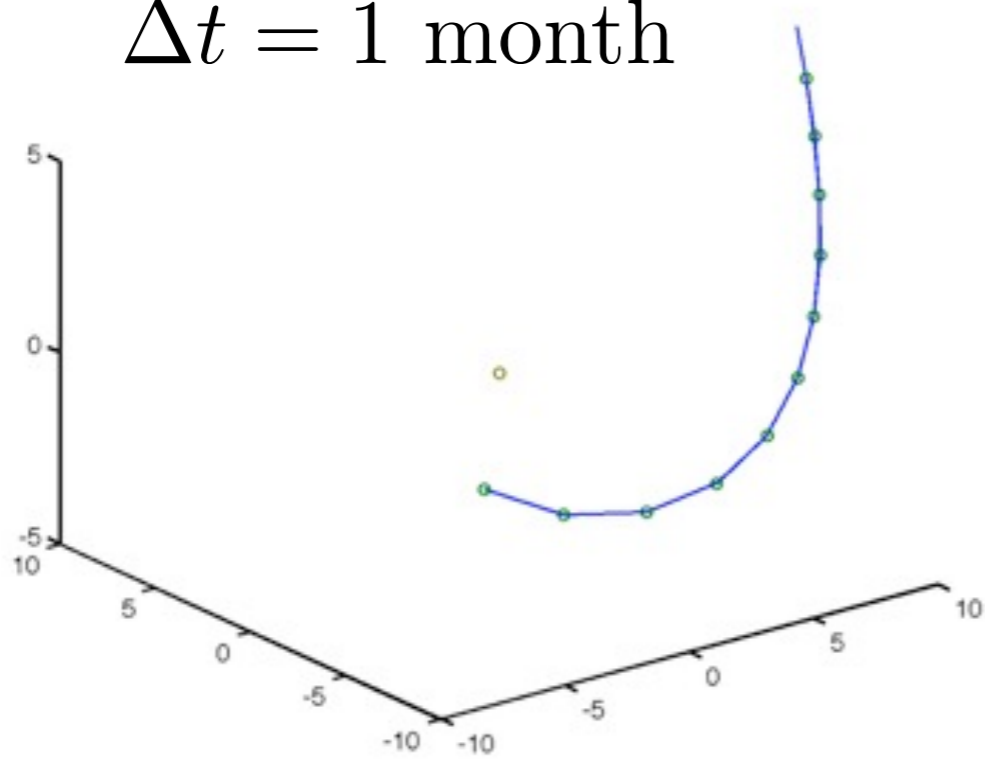


$$X_1 = X_0 + \Delta t V_0$$

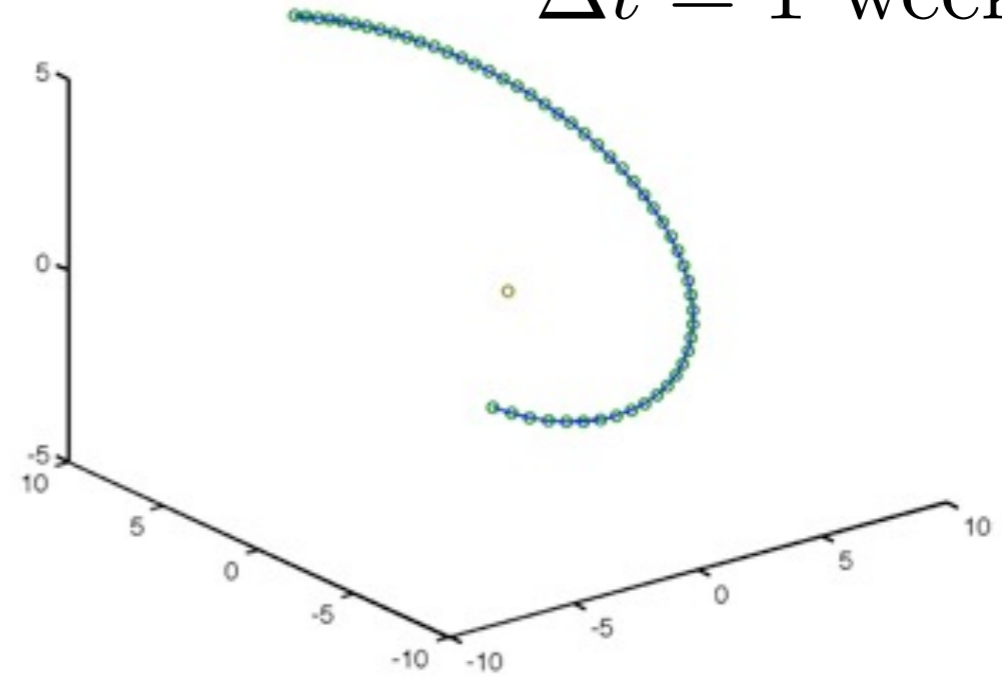
$$V_1 = V_0 + \Delta t F_0$$

Fouten en convergentie (planeet)

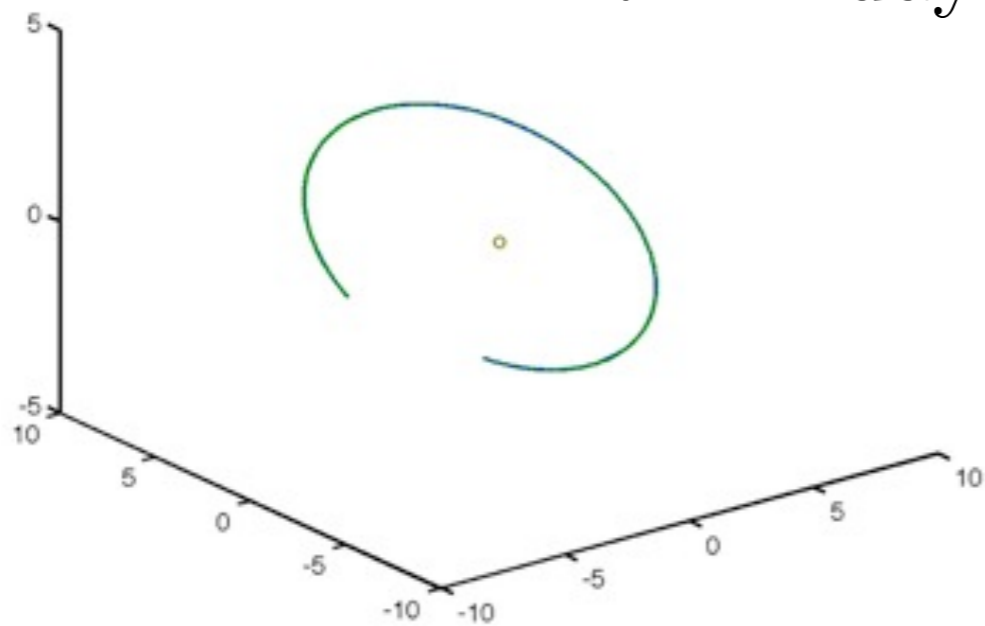
$\Delta t = 1$ month



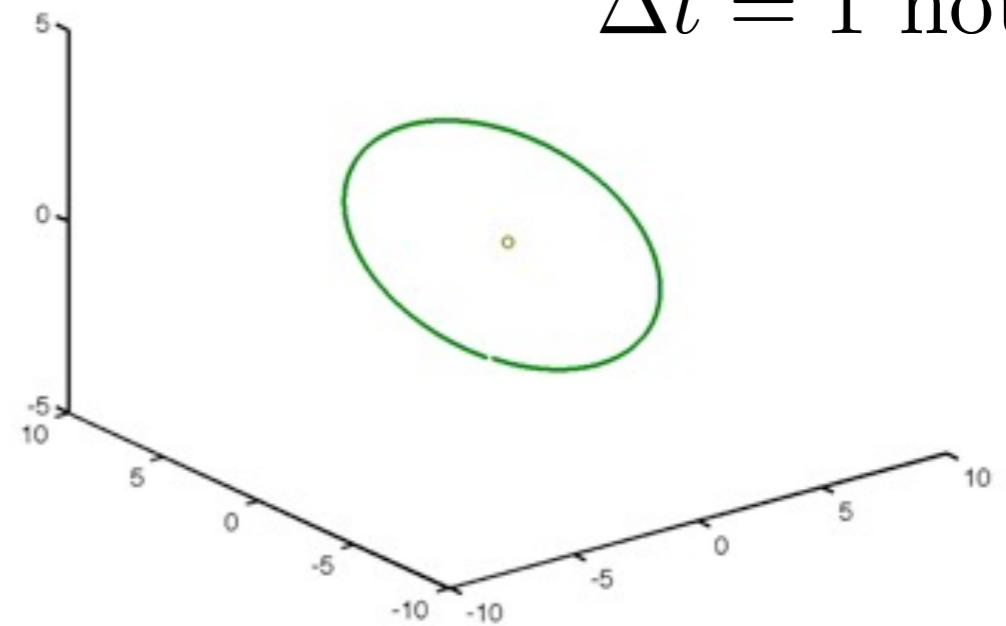
$\Delta t = 1$ week



$\Delta t = 1$ day



$\Delta t = 1$ hour

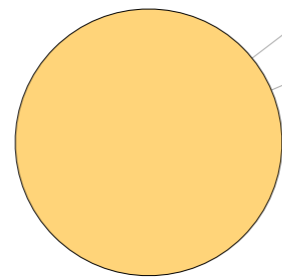
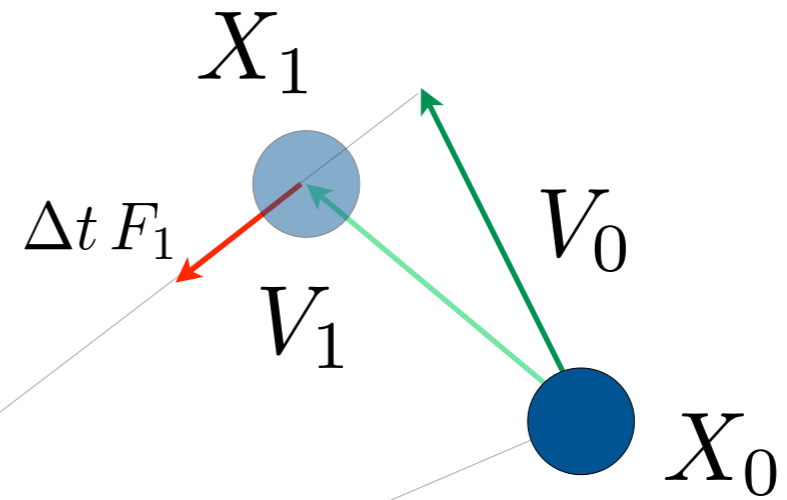


Numerieke methoden

“Backward” Euler



Leonhard Euler (1707-1783)

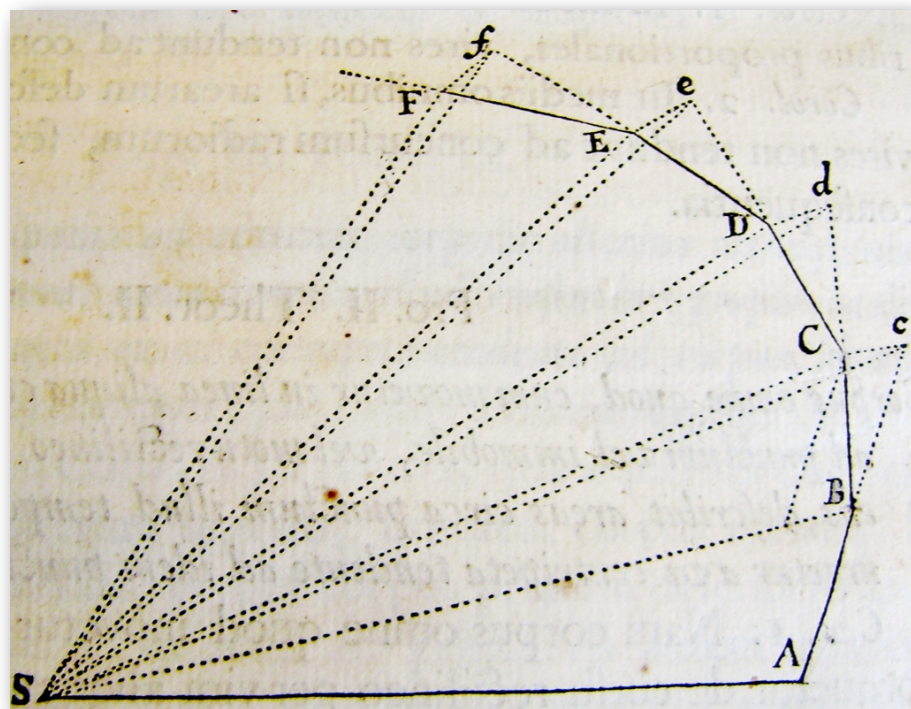
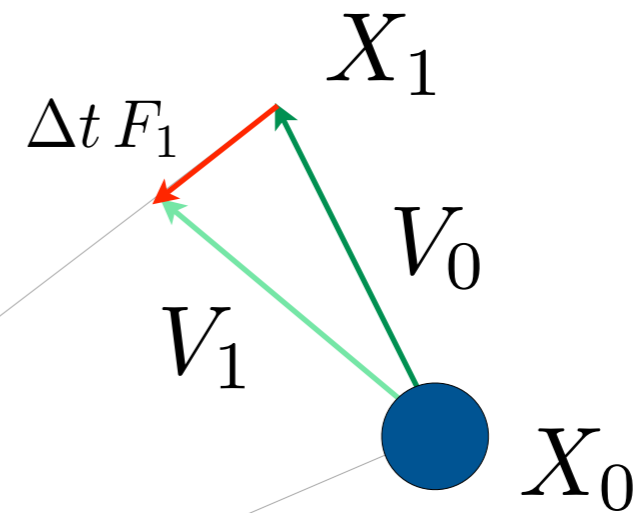
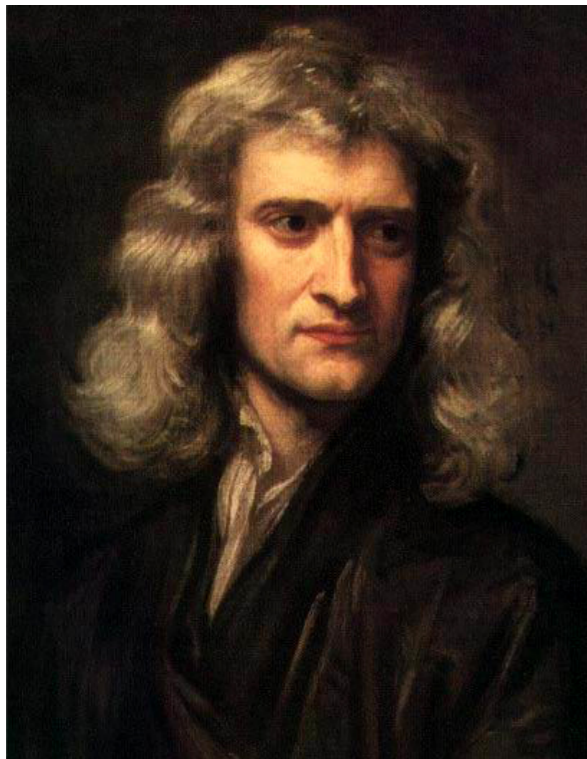


$$X_1 = X_0 + \Delta t V_1$$

$$V_1 = V_0 + \Delta t F_1$$

Numerieke methoden

Newton's method



$$X_1 = X_0 + \Delta t V_0$$

$$V_1 = V_0 + \Delta t F_1$$

Voldoet aan 2e wet van Kepler
(*Principia*)

Euler



Backward Euler



Newton

