**Euler and Euler-Cromer Methods**

In a lot of physics problems we are interested in finding position, velocity, and acceleration in terms of time.. In some cases like the case of constant acceleration, it is easy to find analytical formulas that give the relationship between them which are known as kinematic equations for constant acceleration. Suppose we know acceleration and the initial position and velocity. The velocity is given by

(1)

and the position is given by

(2)

This is known as Euler method. Since we have the information at previous time, , we can calculate the velocity and position at the new time . We will follow this process step by step from initial time to find out the velocity and position for all time. Since we will get the velocity at new time, , from equation (1) we can use this velocity, to calculate position at . This method is known as Euler-Cromer method.

and the position is given by

(3)

According to the Newton’s second law acceleration is given by

(4)