

INFOMGP - GAME PHYSICS

EXERCISES LECTURE 5

EXERCISE 5.1

Suppose you have an object at $t = 0$ second sitting still at the origin. Its mass is 1 kg and the net force applied on it is $F(t) = \begin{pmatrix} 0 \\ t + 1 \end{pmatrix}$. Find the position of the object after 1, 2 and 3 seconds using Euler's method.

EXERCISE 5.2

Assuming an object is decelerated by a drag force of $a(t, v) = -v$ and at $t = 0$ second the velocity of the object is 20 m/s. What will be the velocity of the object after 0.5 second?

Calculate $v(t + \Delta t)$ with Euler's method, the midpoint method, the improved Euler's method and RK4 method.

Then compare the results with the ideal solution (*hint: $\int dv = \int -v(t)dt \Leftrightarrow v(t) = v(0)e^{-t}$*).