Physics 1: Class 5

Max Jauregui

March 27, 2019

1 Constant acceleration (continuation)

Figure 1 shows the v vs t and x vs t graphs for a motion of a particle with constant acceleration.
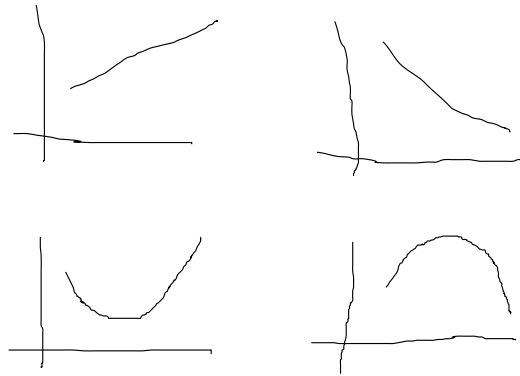

Figure 1: v vs t and x vs t graphs for the motion of a particle eith constant acceleration.

Exercise 1.1. A car moves with a constant velocity of $90\,\mathrm{km/h}$. In a certain instant the driver of the car puts the brakes on and the car travels $60\,\mathrm{m}$ until it stops. Assuming constant acceleration, find the acceleration of the car? *Answer:* $-5{,}21\,\mathrm{m/s^2}$.

Exercise 1.2. A plane initially at rest has a uniform acceleration and travels $800\,\mathrm{m}$ in order to take off, which it does with a velocity of $360\,\mathrm{km/h}$. How much time does the plane take to take off? *Answer:* $16\,\mathrm{s}$.

Exercise 1.3. A car moves with a constant velocity of $36\,\mathrm{km/h}$. When the car is at a distance of $60\,\mathrm{m}$ from traffic lights, the traffic lights turn yellow and the driver presses on the accelerator in order to run it. Taking into account

that the reaction time of the driver is 0,6 s, calculate the minimum value of the acceleration of the car in order to run the yellow traffic light, knowing that it lasts 4 s. *Answer:* $1{,}75 \, \text{m/s}^2$.

2 Free fall

In this case $|a| = g = 9{,}8 \, \text{m/s}$. Usually we use the y axis instead of x axis. If the y axis point upwards, $a = -g$; otherwise $a = g$.

Exercise 2.1. A particle is initially at rest at height h from the ground. How much time it will take to reach the ground? What will be its velocity in this moment?