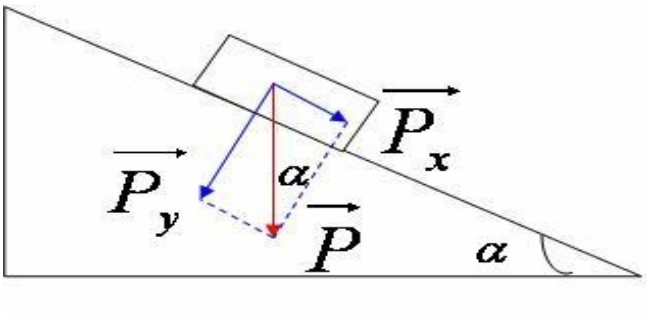
In this laboratory, the relationship between the velocity of the car and the angle of the road is investigated. In order to concentrate into this relationship, the following asumptions are made:

- The car is moving on a strait line street. Then the Angle velocity is not taken into account;
- At the beginning, the car is moving at constant speed. It means the net force of Traction and Friction forces is zero.
- The Traction and the Friction forces are unchanged, while the road surface changes the direction.

In this case, the net force effecting the moving of the car is solely the gravity force. The effect of this gravity force on a moving car depends on the road angle, which can be classified into 3 following catergories:

1. Horizontal lines. Angle of the road equals zero ;
2. Ramp up. Angle of the road equals α compared to the horizontal ;
3. Slope downward. Angle of the road equals -α compared to the horizontal ;



In order to define the result of this force, it is broken into two components. The formula for calculating the components of this force as follows :

- $Px = P.\cos\alpha = m.g.\cos\alpha$
- $Py = - P.\sin\alpha = -m.g.\sin\alpha$

It is readily seen that only Py has effect on the velocity of the car due to it has the same direction with the moving direction of the car and make a change on the net force acting on the the car.

The acceleration of the car is calculated by the following formula :

$a = Py / m = - m.g. \sin\alpha / m = -g.\sin\alpha = - 10.\sin\alpha$

Applying this formula , we have

1. When the road is of the horizontal line , $\alpha = 0$, so $a = 0$ and the force does not make any change in the speed of the car .
2. When the road is on the ramp with the value $0 < \alpha < \pi / 2$. $0<\sin\alpha<1$, so $-10 <a < 0$, the speed of the car decreases;

When the road is on the ramp with the value $-\pi / 2 < \alpha < 0$, $-1<\sin\alpha<0$, so $0 <a < 10$, the speed of the car gradually increases;