

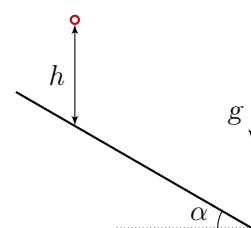


*So what are you saying, physics?  
Cooling down of relations between people,  
as a result of friction between them.*

*Stanisław Jerzy Lec*

## Uymin's factor

Point particle hits the inclined plane from the height  $h$  without the initial velocity. Point's collisions with the plane are absolutely elastic. Coefficient of friction between the point and the plane is  $\mu$ .



1. During the entire time of movement the point reaches the height of the first collision three times (including the first one). Find the angle  $\alpha$  between the inclined plane and the horizon in the following cases:
  - a) (2,5 points)  $\mu = 0$ ;
  - b) (2,5 points)  $\mu > \operatorname{tg} \alpha$ .
2. Let  $\alpha$  be equal to  $\pi/6$ . Find the displacement of the point particle in time  $t \gg \sqrt{\frac{h}{g}}$  in the following cases:
  - a) (2,5 points)  $\mu = 0,5$ ;
  - b) (2,5 points)  $\mu = 0,8$ .

*Note:* an absolutely elastic collision with the friction is the collision, in which the component of the momentum perpendicular to the surface changes to the opposite one during the collision.

*Problem's author: Roman Safonov.*

First hint — 03.05.2021 14:00 (GMT+3)

Second hint — 05.05.2021 14:00 (GMT+3)

End of the first tour — 07.05.2021 22:00 (GMT+3)