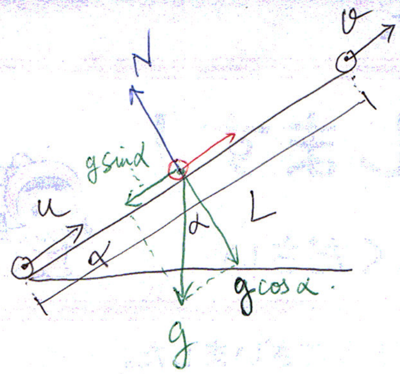


Along the ~~movem~~ movement on the smooth inclined plan, the ball will receive g force. The g force NORMAL (perpendicular) to the ~~path~~ plane has no influence to the movement of the ball.

Only the g force parallel to the inclined plane needs to be considered. (~~perpend~~ parallel to the plane)

Let the velocity of the ball as the function of time, t, be $v(t)$.

So, $v(t) = u - g\sin\alpha \cdot t$. - - - - - → ①

Then, find time needed to travel the distance L. That is,

$$L = ut - \frac{1}{2} g \sin\alpha \, t^2 \Rightarrow \frac{1}{2} g \sin\alpha \, t^2 - ut + L = 0$$

$$\Rightarrow t_{1,2} = \frac{u \pm \sqrt{u^2 - 2g\sin\alpha \, L}}{g\sin\alpha}.$$

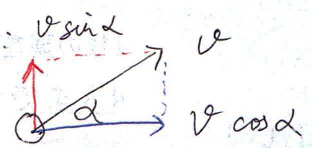
Using the above result, find the velocity of the ball at the end of L, that is v ? (using eqn ①)

$$v = u - \cancel{g\sin\alpha}\left(\frac{u \pm \sqrt{u^2 - 2gL\sin\alpha}}{\cancel{g\sin\alpha}}\right)$$

$$= u - u \mp \sqrt{u^2 - 2gL\sin\alpha}$$

$$v = \sqrt{u^2 - 2gL\sin\alpha}.$$

~~Atth~~ At the end of the plane, L, the velocity of the ball is :



The ~~v~~ vertical part of v will receive the g force, so it will decrease to 0, then increased to more than 0 downward.

So the minimum speed of the ball is $v\cos\alpha$, i.e.,

$$\cos\alpha\sqrt{u^2 - 2gL\sin\alpha}.$$

Note: $u^2 - 2gL\sin\alpha > 0$ is the condition for the ball to be able to clear off the inclined plane.