Answer on Question #47792 – Physics - Mechanics | Kinematics | Dynamics

Decent vehicle is traveling vertical@ 5.5 m/s and has horizontal velocity of 3.5 m/s . What speed and angle is descent path

Solution:

$V_y = 5.5\frac{m}{s} - \text{vertical component of the speed;}$

$V_x = 3.5\frac{m}{s} - \text{horizontal component of the speed;}$

$V - \text{speed of the vehicle;}$

$\alpha - \text{angle between speed components;}$

Using Pythagoras's theorem for the right triangle, we can find speed of the vehicle:

$$V = \sqrt{V_x^2 + V_y^2} = \sqrt{\left(5.5\frac{m}{s}\right)^2 + \left(3.5\frac{m}{s}\right)^2} = 6.52\frac{m}{s}$$

To find angle α, we can use the tangent definition (from the right triangle):

$$\tan\alpha = \frac{V_y}{V_x}$$

$$\alpha = \arctan\left(\frac{V_y}{V_x}\right) = \arctan\left(\frac{5.5\frac{m}{s}}{3.5\frac{m}{s}}\right) = 57.5°$$

Answer: speed: $6.52\frac{m}{s}$, angle $57.5°$;