Answer on Question 48682, Physics, Mechanics | Kinematics | Dynamics

Question:

A particle is (X-Y) plane such that it's velocity is given by $V = vi + xj$ where i and j are vector. The equation of it's trajectory is?

Solution:

First, we find the projections of particle on axis x and y, respectively:

$$x = v_x t,$$

$$y = v_y t.$$

where v_x and v_y is the projections of velocity of particle on axis x and y, t is the time. From the conditions of the problem we know that:

$$v_x = v,$$

$$v_y = x.$$

Substituting v_x and v_y to the formula for projections of particle on axis x and y we obtain:

$$x = vt,$$

$$y = xt.$$

Finally, we obtain equation of particle trajectory: $x = vt,\ y = vt^2.$

Answer:

The equation of particle trajectory is $x = vt,\ y = vt^2.$