

for 0.500 s? Express your answers in terms of the unit vectors \mathbf{i} and \mathbf{j} .

\mathbf{i} - points in the positive x-axis direction, \mathbf{j} - points in the positive y-axis direction.

$$F(t) = (\alpha t^2)\mathbf{i} + (\beta + \gamma t)\mathbf{j} = m\mathbf{a} \rightarrow \mathbf{a} = \frac{(\alpha t^2)\mathbf{i} + (\beta + \gamma t)\mathbf{j}}{m}$$

$$\vec{v} = \int_0^T \vec{a} dt = \int_0^5 \frac{(\alpha t^2)\mathbf{i} + (\beta + \gamma t)\mathbf{j}}{m} dt = \frac{1}{m} \left(\frac{\alpha 0.5^3}{3} \right) \mathbf{i} + \left(\beta 0.5 + \frac{\gamma 0.5^2}{2} \right) \mathbf{j}$$

\mathbf{i} - points in the positive x-axis direction

$$v_i = \frac{1}{2} \cdot 25 \cdot \frac{0.0625}{3} = 0.26 \frac{m}{s}$$

$$v_j = 30 \cdot 0.5 + 5 \cdot \frac{0.25}{2} = 15.625 \frac{m}{s}$$