

Vector Functions and Curves
One variable functions

Question

Find the velocity, speed and acceleration of the particle with position given by $\underline{r}(t)$ at time t . Also determine the particles path.

$$\underline{r} = t\underline{i} + t^2\underline{j} + t^2\underline{k}$$

Answer

Position: $\underline{r} = t\underline{i} + t^2\underline{j} + t^2\underline{k}$

Velocity: $\underline{v} = \underline{i} + 2t\underline{j} + 2t\underline{k}$

Speed: $v = \sqrt{1 + 8t^2}$

Acceleration: $\underline{a} = 2\underline{j} + 2\underline{k}$

Path: the parabola $y = z = x^2$.