

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.

$$\underline{r} = ae^t\underline{i} + be^t\underline{j} + ce^t\underline{k}$$

Answer

Position: $\underline{r} = ae^t\underline{i} + be^t\underline{j} + ce^t\underline{k}$

Velocity: $\underline{v} = \underline{r}'$

Speed: $v = e^t\sqrt{a^2 + b^2 + c^2}$

Acceleration: $\underline{a} = \underline{v}' = \underline{r}''$

Path: the half-line $\frac{x}{a} = \frac{y}{b} = \frac{z}{c} > 0$.