

1.3-Vector-Valued Functions and Parametrized Curves

Definitions:

Recall: Function-

Vector-Valued Function-

Parametrized Curve-

Vector/Parametric Equations of Lines

Other Parametrized Curves

Examples:

Find the Cartesian equation of the curve parametrized by $x = \sqrt{t}$, $y = 2t + 4$ and sketch the graph.

Describe the motion of a particle with position $\mathbf{r}(t) = \langle 2 \cos t, -5 \sin t \rangle$, $0 \leq t \leq 2\pi$.

Find vector and parametric equations of the line passing through the points $(-4, 2)$ and $(2, 14)$

A water balloon is thrown with an initial velocity of 15 meters per second at an angle of elevation of 30° . Soon you will be able to derive the following parametric equations for the motion of the balloon:

$$x = \frac{15\sqrt{3}}{2}t, y = \frac{15}{2}t - 4.9t^2$$

Determine how far away the balloon will strike the ground and find the Cartesian equation of the balloon's motion.