Formulas & Definitions: Section 13-1

Definition: If $f(t), g(t)$, and $h(t)$ are the components of the vector $r(t)$, then f, g, and h are real-valued functions called the **component functions** of r and we can write

$$r(t) = \langle f(t), g(t), h(t) \rangle = f(t)i + g(t)j + h(t)k.$$

Definition: If $r(t) = \langle f(t), g(t), h(t) \rangle$, then

$$\lim_{t \to a} r(t) = \left\langle \lim_{t \to a} f(t), \lim_{t \to a} g(t), \lim_{t \to a} h(t) \right\rangle$$

provided the limits of the component functions exist.

Definition: A vector function r is **continuous at** a if

$$\lim_{t \to a} r(t) = r(a).$$

Definition: Suppose that f, g, h are continuous real-valued functions on an interval I. Then the set C of all points (x, y, z) in space, where

$$x = f(t), \quad y = g(t), \quad z = h(t)$$

and t varies throughout the interval I, is called a **space curve**. The above equations are called **parametric equations of C** and t is called a parameter.