

11.2 Limits and Continuity

Example 1

Let's consider the functions

$$f(x, y) = \frac{\sin(x^2 + y^2)}{x^2 + y^2}$$

And

$$g(x, y) = \frac{x^2 - y^2}{x^2 + y^2}$$

Definition of

$$\lim_{(x,y) \rightarrow (a,b)} f(x, y) = L$$

Path Independence

Example 2

Find

$$\lim_{(x,y) \rightarrow (0,0)} \frac{xy}{x^2 + y^2}$$

If it exists.

Example 3

Find

$$\lim_{(x,y) \rightarrow (0,0)} \frac{xy^2}{x^2 + y^4}$$

If it exists.

Example 4

Find

$$\lim_{(x,y) \rightarrow (0,0)} \frac{3x^2y}{x^2 + y^2}$$

If it exists.

Continuity

Definition of continuity of a function $f(x, y)$ at a point (a, b)

Examples of Continuous Functions

Limits of continuous functions

Example 5

Where is the function $z = \arctan\left(\frac{x}{y}\right)$ continuous?

HW # 1, 3, 5, 7, 11, 13, 27, 31