

Continuity 2-1

Continuity 2-1 is an application for investigating the possible continuity of real-valued functions of two variables. To use Continuity 2-1, type a function $f(x, y)$ into the text field in the box labeled "Function Control". Only the letters x and y can be used as variables. The standard operations of addition, subtraction, multiplication and division should be represented by $+$, $-$, $*$ and $/$, respectively. Exponentiation may be represented by either $**$ or $^$. Parentheses may be used for grouping. In addition, the expression for your function may contain the following functions.

sin, cos, tan, sec, csc, cot
arcsin, arccos, arctan
sqrt, cbrt
exp
ln, log
sinh, cosh
abs

trig functions
inverse trig functions
square and cube root functions
exponential
natural log and common log
hyperbolic functions
absolute value

For example, the following is a legal function.

$$x * y - \ln(y) + x / \cos(x^2 + y)$$

For users accustomed to *Mathematica* notation, you may also use *Mathematica* notation such as $\text{Cos}[x + y^2]$. Note, however, a space cannot be used to denote multiplication.

After entering your function, press Return or click the button labeled "Parse Function".

The centers and radii of the epsilon and delta neighborhoods can be specified in the box labeled "Neighborhood Controls".

When the cursor is moved to a point (x, y) in the domain, its appearance will

change from the usual arrow to an X. Furthermore, if your function was successfully parsed, a line segment will be drawn joining the point (x, y) and $f(x, y)$. If you click the mouse while over the domain, the values of x , y , and $f(x, y)$ will be displayed.

For finer control while investigating $f(x, y)$, you can zoom in or out on both the domain and range as well as change the point at which the graphs are centered. This control can be achieved by using the sliders and text fields in the boxes labeled "Range Controls" and "Domain Controls".