Natural logarithm - 2D and 3D graphs

In the following example we will present the natural logarithm on the complex plane in 2D and 3D graphs.

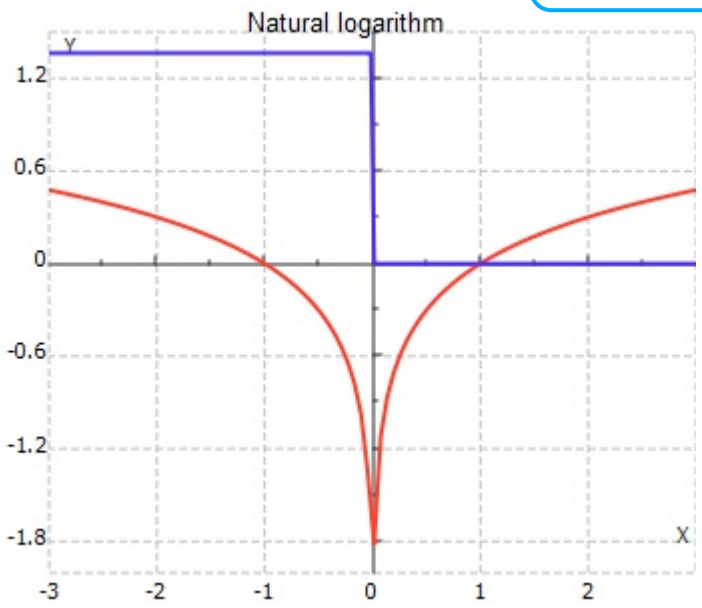
First we will draw the 2D graph, real parts and imaginary parts will be two separated plots presented on the same graph. Argument x will take values at a interval of [-3 , 3] with two hundred samples.

$a := \text{complexcurve2dre}\left(\log(x), -3, 3, 200\right)$

Extract the real part of the complex values and prepare them for plotting

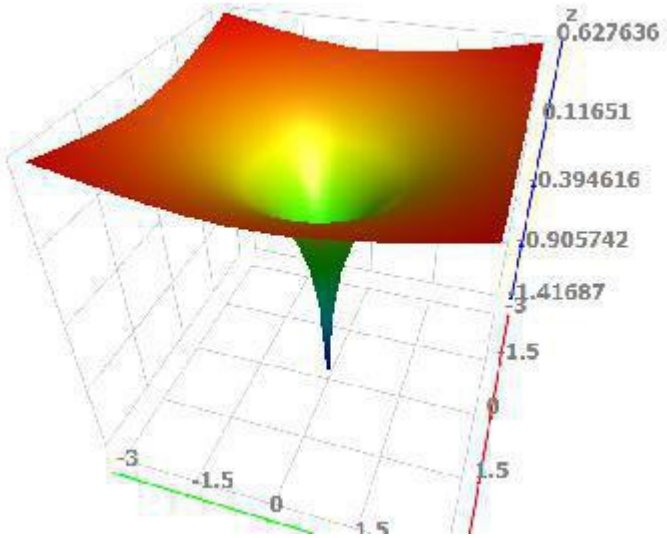
$b := \text{complexcurve2dimg}\left(\log(x), -3, 3, 200\right)$

Extract the imaginary part of the complex values and prepare them for plotting



Now, we will present inverse cotangent complex plane values in 3D graph.

$c := \text{surface3d}\left(\text{Re}\left(\log(x + 1i \cdot y)\right), x, -3, 3, 100, y, -3, 3, 100\right)$

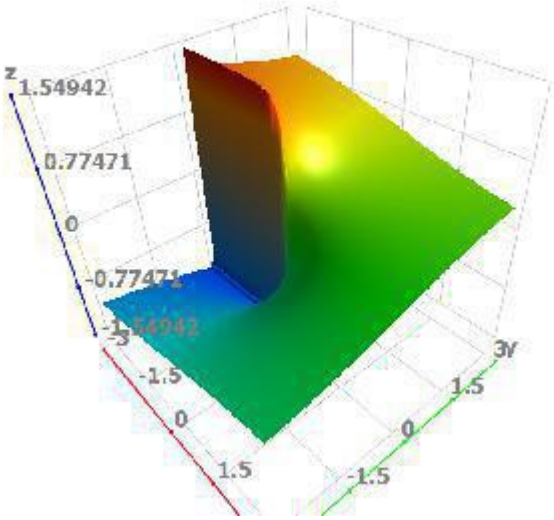


Real part of log(z) over the complex z-plane

x-axis is at a interval of [-3 , 3] with 100 samples

y-axis is at a interval of [-3 , 3] with 100 samples

$$d := \text{surface3d}\left(\text{Im}\left(\log\left(x + 1i \cdot y\right)\right), x, -3, 3, 100, y, -3, 3, 100\right)$$



Imaginary part of log(z) over the complex z-plane

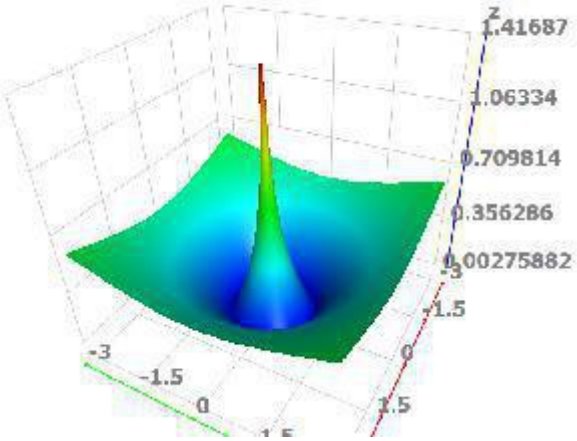
x-axis is at a interval of [-3 , 3] with 100 samples

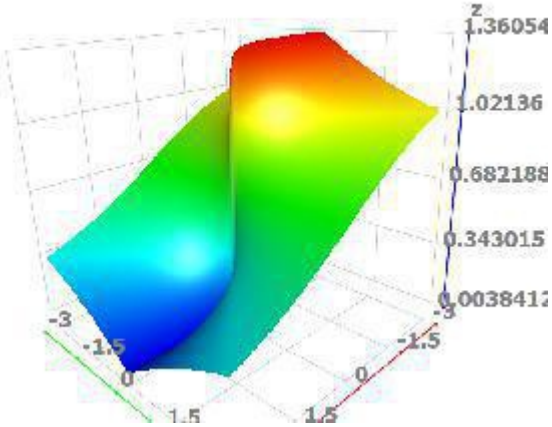
y-axis is at a interval of [-3 , 3] with 100 samples

On the next two 3D-graphs we will draw absolute value of real and imaginary parts respectively.

$$e := \text{surface3d}\left(\left|\text{Re}\left(\log\left(x + 1i \cdot y\right)\right)\right|, x, -3, 3, 100, y, -3, 3, 100\right)$$

$$f := \text{surface3d}\left(\left|\text{Im}\left(\log\left(x + 1i \cdot y\right)\right)\right|, x, -3, 3, 100, y, -3, 3, 100\right)$$





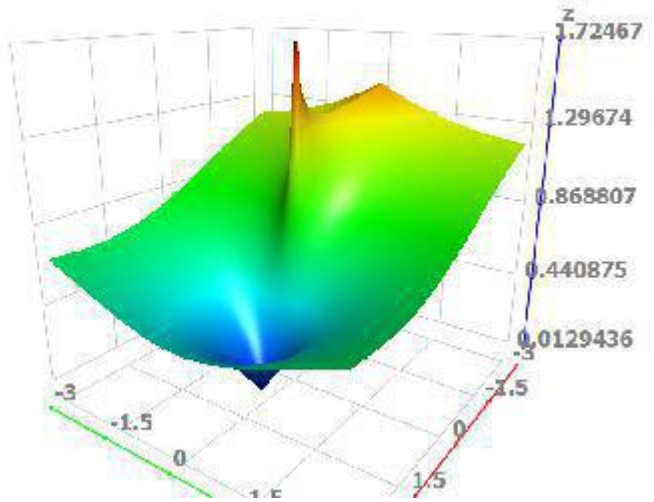
Absolute value of the real part of log(z) over the complex z-plane

Absolute value of the imaginary part of log(z) over the complex z-plane

x-axis is at a interval of [-3 , 3] with 100 samples
y-axis is at a interval of [-3 , 3] with 100 samples

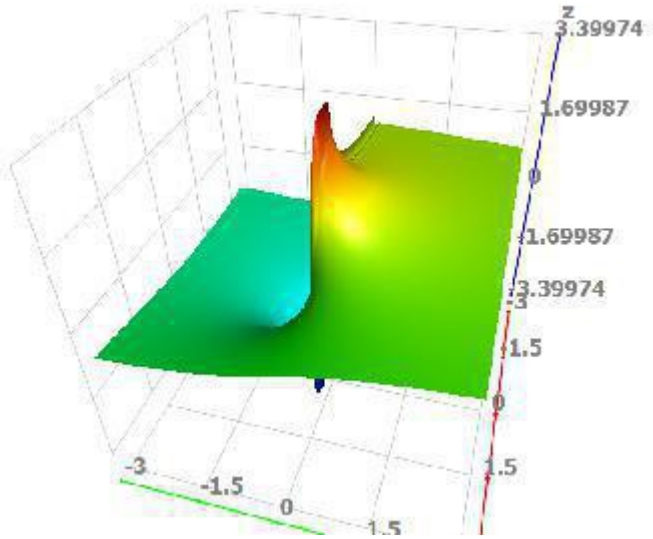
On final graphs we will draw absolute value and argument of natural logarithm function in complex plane.

$$g := \text{surface3d}\left(\left|\log\left(x + 1i \cdot y\right)\right|, x, -3, 3, 100, y, -3, 3, 100\right)$$



Absolute value of log(z) over the complex z-plane

$$h := \text{surface3d}\left(\Theta\left(\log\left(x + 1i \cdot y\right)\right), x, -3, 3, 100, y, -3, 3, 100\right)$$



Argument of log(z) over the complex z-plane