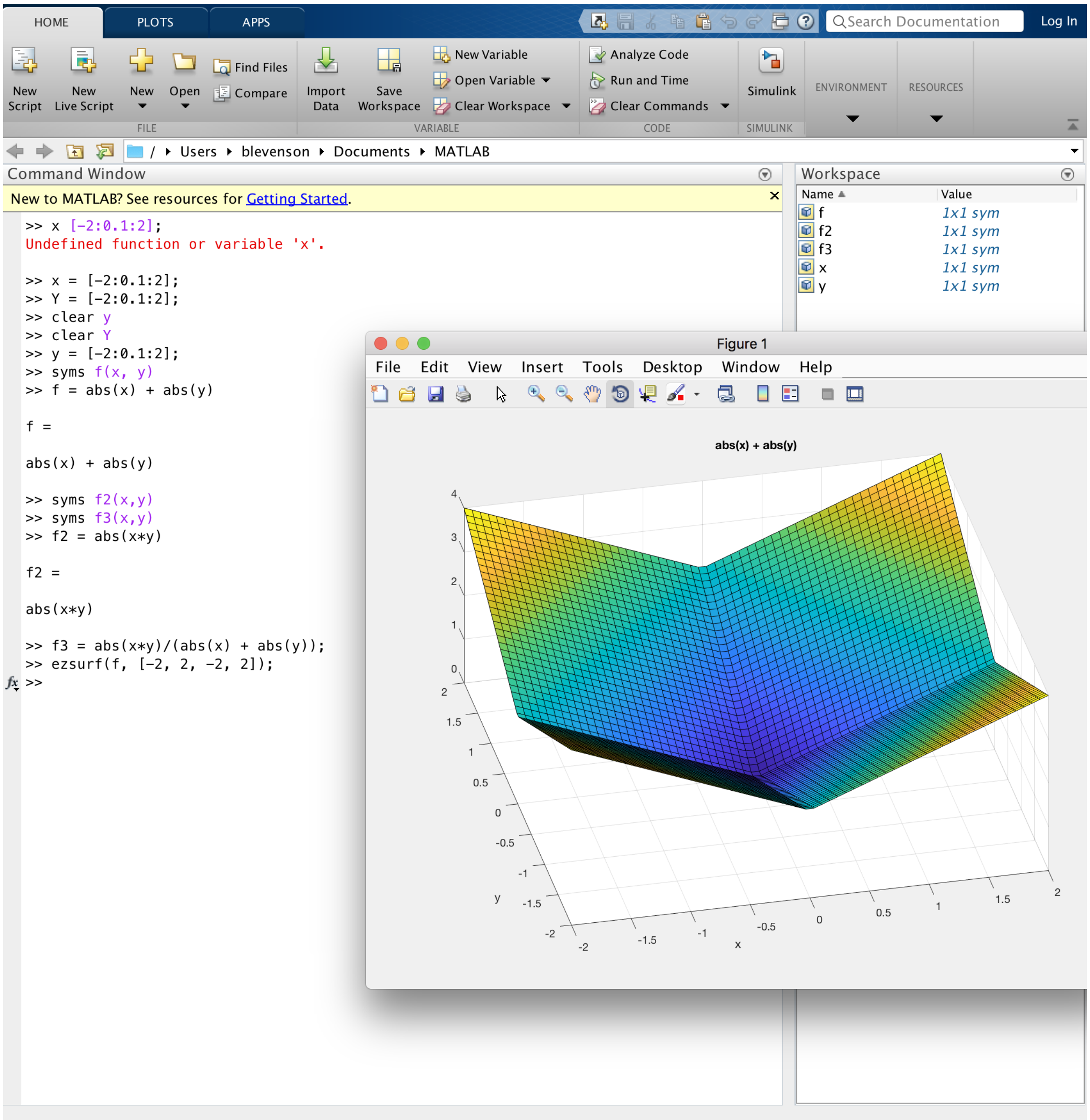
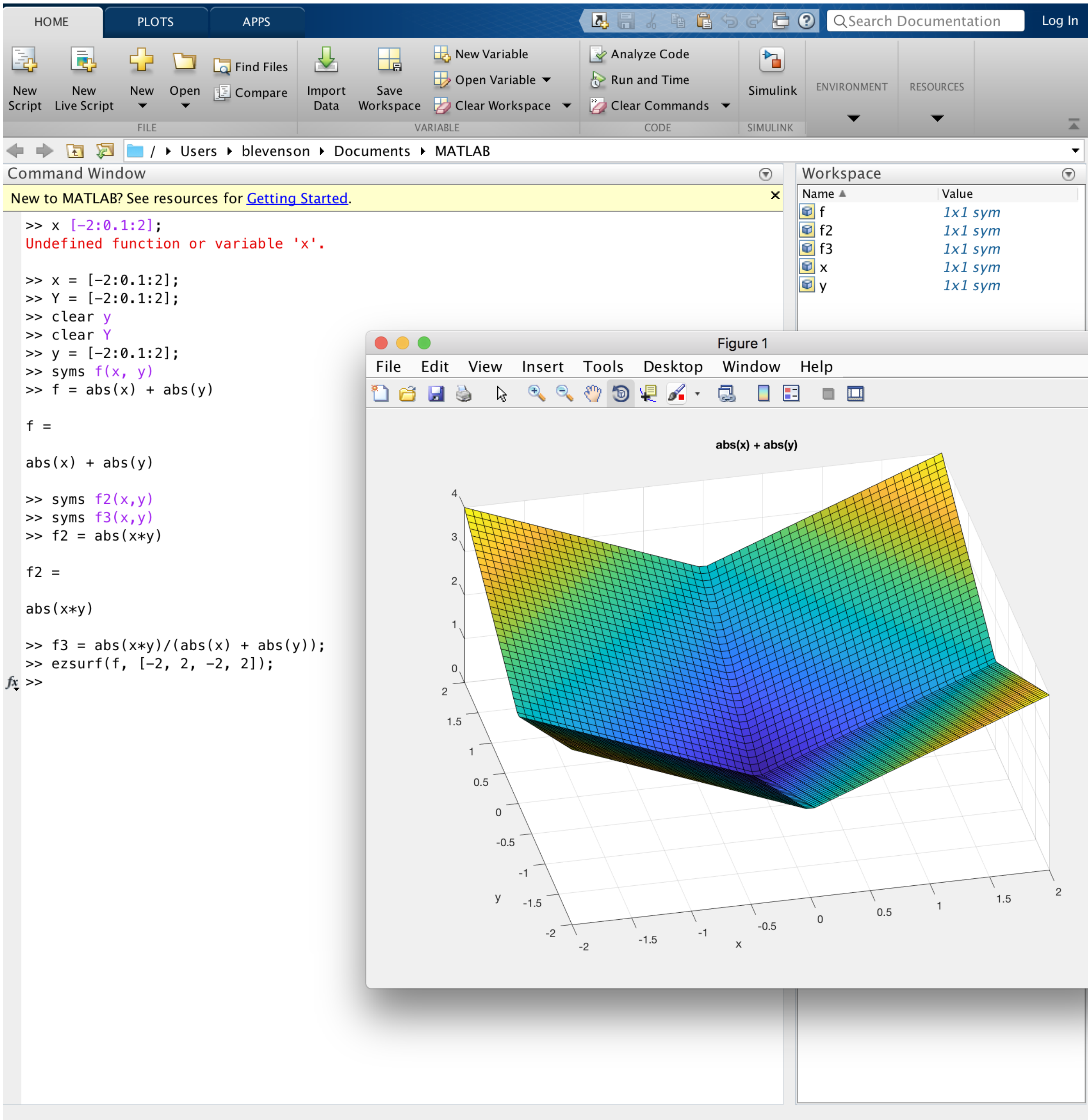
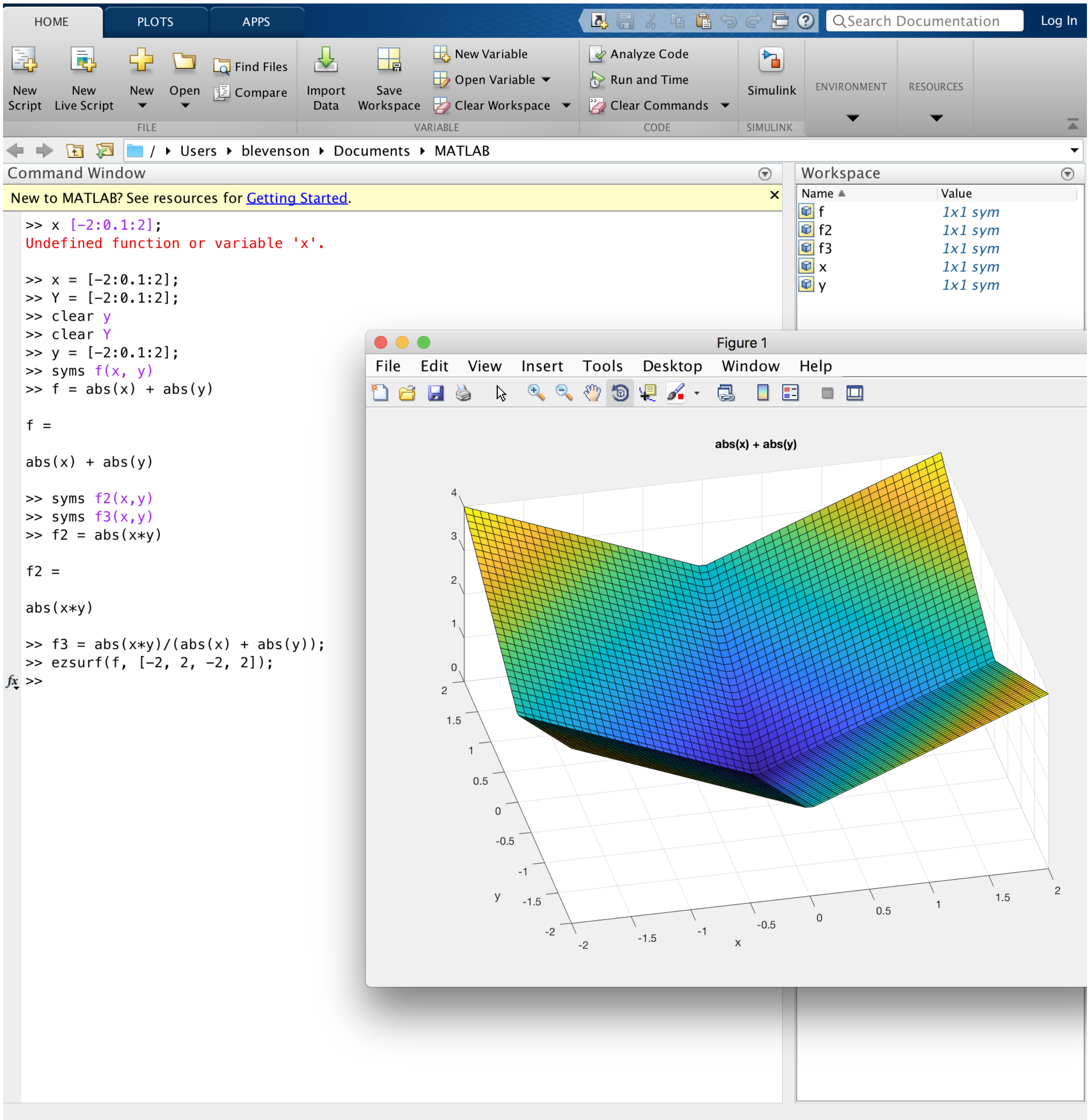
Brett Levenson, Andy Poulos, Rishabh Shah, John Stefan
October 2, 2017
Lab 2

Exercise One:




HOME
PLOTS
APPS
Search Documentation
Log In
New Script
New Live Script
New
Open
Find Files
Compare
FILE
Import Data
Save Workspace
New Variable
Open Variable
Clear Workspace
VARIABLE
Analyze Code
Run and Time
Clear Commands
CODE
Simulink
SIMULINK
ENVIRONMENT
RESOURCES
/ Users blevenson Documents MATLAB
Command Window
New to MATLAB? See resources for Getting Started.
>> x [-2:0.1:2];
Undefined function or variable 'x'.
>> x = [-2:0.1:2];
>> Y = [-2:0.1:2];
>> clear y
>> clear Y
>> y = [-2:0.1:2];
>> syms f(x, y)
>> f = abs(x) + abs(y)
f =
abs(x) + abs(y)
>> syms f2(x,y)
>> syms f3(x,y)
>> f2 = abs(x*y)
f2 =
abs(x*y)
>> f3 = abs(x*y)/(abs(x) + abs(y));
>> ezsurf(f, [-2, 2, -2, 2]);
>>
Workspace
Name
Value
f 1x1 sym
f2 1x1 sym
f3 1x1 sym
x 1x1 sym
y 1x1 sym
Figure 1
File
Edit
View
Insert
Tools
Desktop
Window
Help
abs(x) + abs(y)
x
y

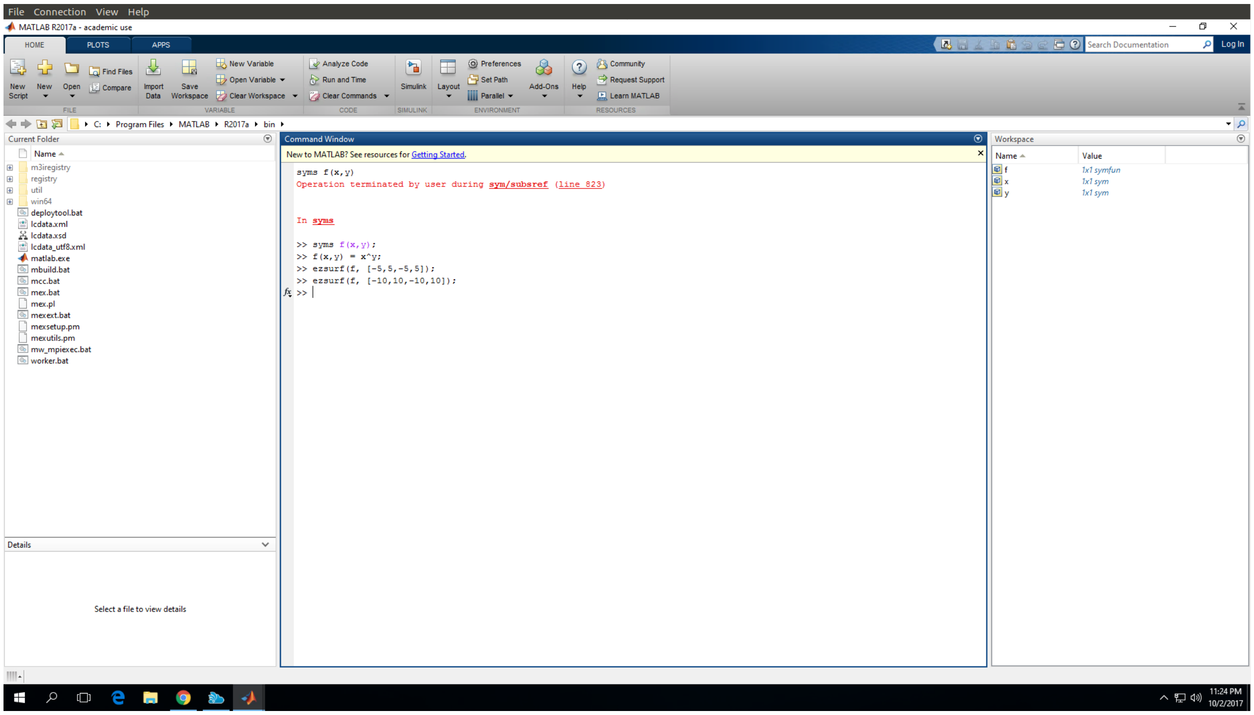

HOME PLOTS APPS
Search Documentation
Log In
New Script
New Live Script
New
Open
Find Files
Compare
Import Data
Save Workspace
New Variable
Open Variable
Clear Workspace
Analyze Code
Run and Time
Clear Commands
Simulink
ENVIRONMENT
RESOURCES
FILE VARIABLE CODE SIMULINK
/ ▸ Users ▸ blevenson ▸ Documents ▸ MATLAB
Command Window
New to MATLAB? See resources for Getting Started.
>> x [-2:0.1:2];
Undefined function or variable 'x'.
>> x = [-2:0.1:2];
>> Y = [-2:0.1:2];
>> clear y
>> clear Y
>> y = [-2:0.1:2];
>> syms f(x, y)
>> f = abs(x) + abs(y)
f =
abs(x) + abs(y)
>> syms f2(x,y)
>> syms f3(x,y)
>> f2 = abs(x*y)
f2 =
abs(x*y)
>> f3 = abs(x*y)/(abs(x) + abs(y));
>> ezsurf(f, [-2, 2, -2, 2]);
>>
Workspace
Name Value
f 1x1 sym
f2 1x1 sym
f3 1x1 sym
x 1x1 sym
y 1x1 sym
Figure 1
File Edit View Insert Tools Desktop Window Help
abs(x) + abs(y)
x
y

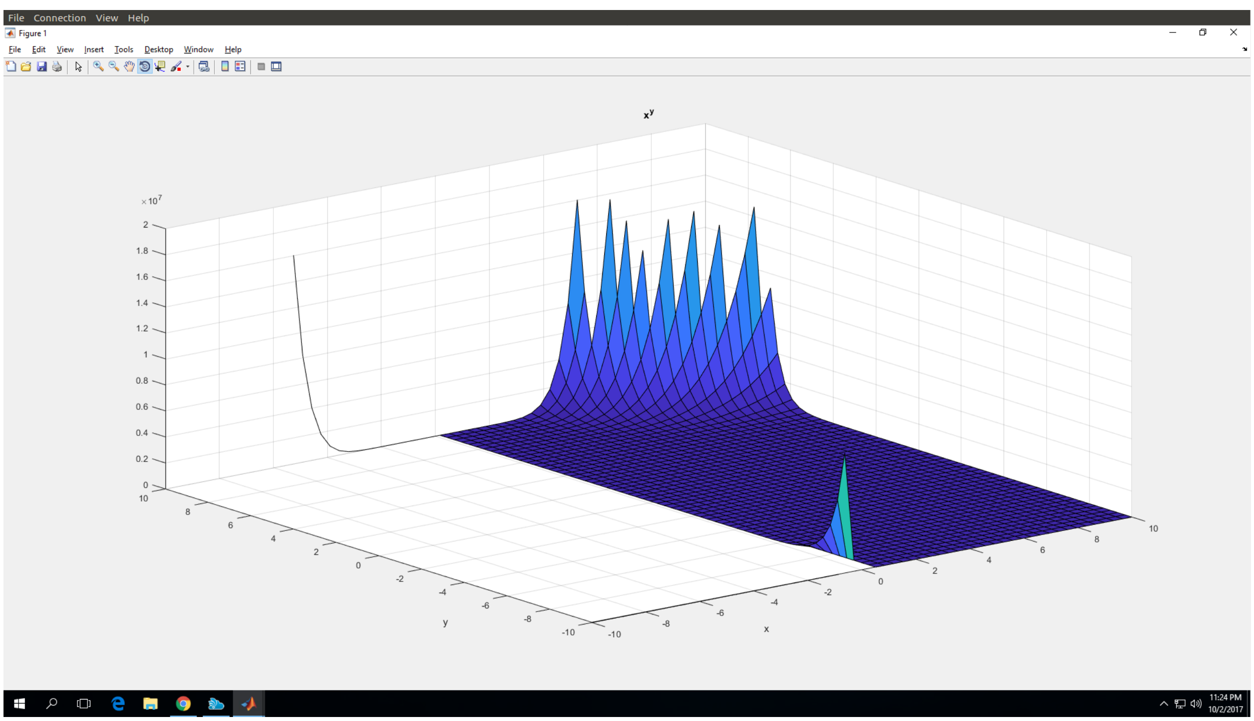
Exercise Two:

```
>> limit(f3, x, 0)

ans =

0

>> limit(f3, y, 0)

ans =

0
```

Figure 1: $f_3(0,0) = 0$ will make the function f_3 continuous at the origin. This works because the limit as you approach this point along the x axis, where the y value is held to zero, the limit approaches $z = 0$. By the same token, as you approach along the y-axis, where the x value is kept at zero, it too approaches $z = 0$. While this does not show that the limit works for all possible ways of approaching the point $(0,0)$, it is enough for us to assume $f_3(0,0) = 0$.

Exercise Three:





I do not think it is possible to assign a value to $f(0,0)$ to make f continuous because there are no values for which f will be continuous.

Exercise Four:

4) If $y=0$ then $f(x,0)$ is the function. $f(1,0)=1$ $f(\frac{1}{2},0)=1$ $f(\frac{1}{100},0)=1$
$\lim_{(x,y)\to(0,0)} f(x,0)=1$

If $x=0$ then $f(0,y)$ is the function. $f(0,1)=0$ $f(0,\frac{1}{2})=0$ $f(0,\frac{1}{100})=0$
$\lim_{(x,y)\to(0,0)} f(0,y)=0$

If $y=x$ then $f(x,y)$ is the function. $F(1,1)=1$ $f(\frac{1}{2},\frac{1}{2})=\frac{1}{\sqrt{2}}$ $f(\frac{1}{100},\frac{1}{100})=.955$
$\lim_{(x,y)\to(0,0)} f(x,y)$ when $x=y$ $=1$

For different curves of $y=r(x)$ we get different limits therefor there is no one limit for $f(x,y)=x^y$ at $(0,0)$.

For any positive A you can find $\lim_{x\to 0} x^{\log_x A}=A$ Therefor you can find any positive limit along the surface as $x\to 0$.

$\lim_{x\to 0} x^{\log_x(1)}=1$ $\lim_{x\to 0} x^{\log_x(2)}=2$ $\lim_{x\to 0} x^{\log_x(3)}=3\ldots$ They all approach differend points with positive y values.