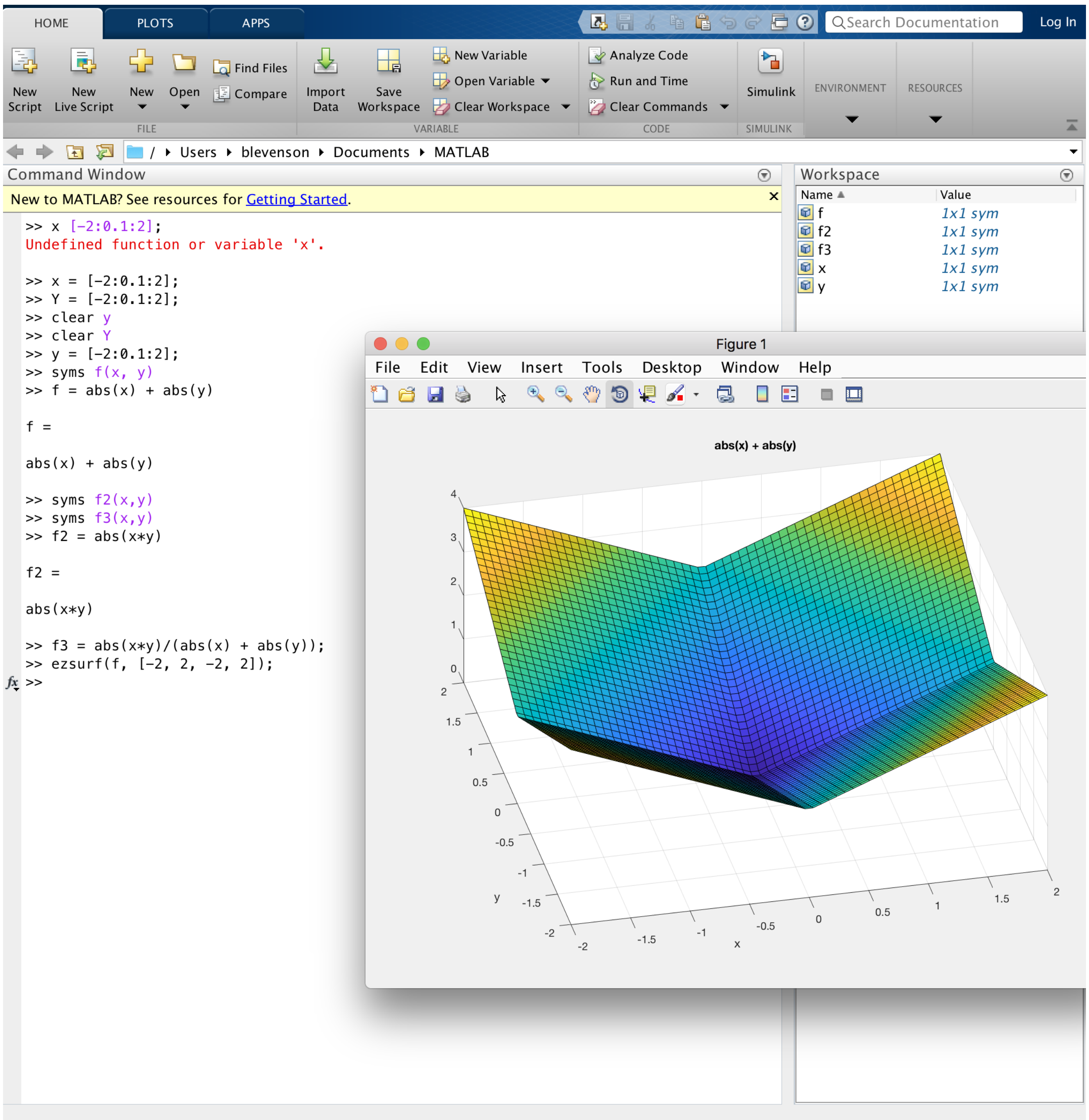
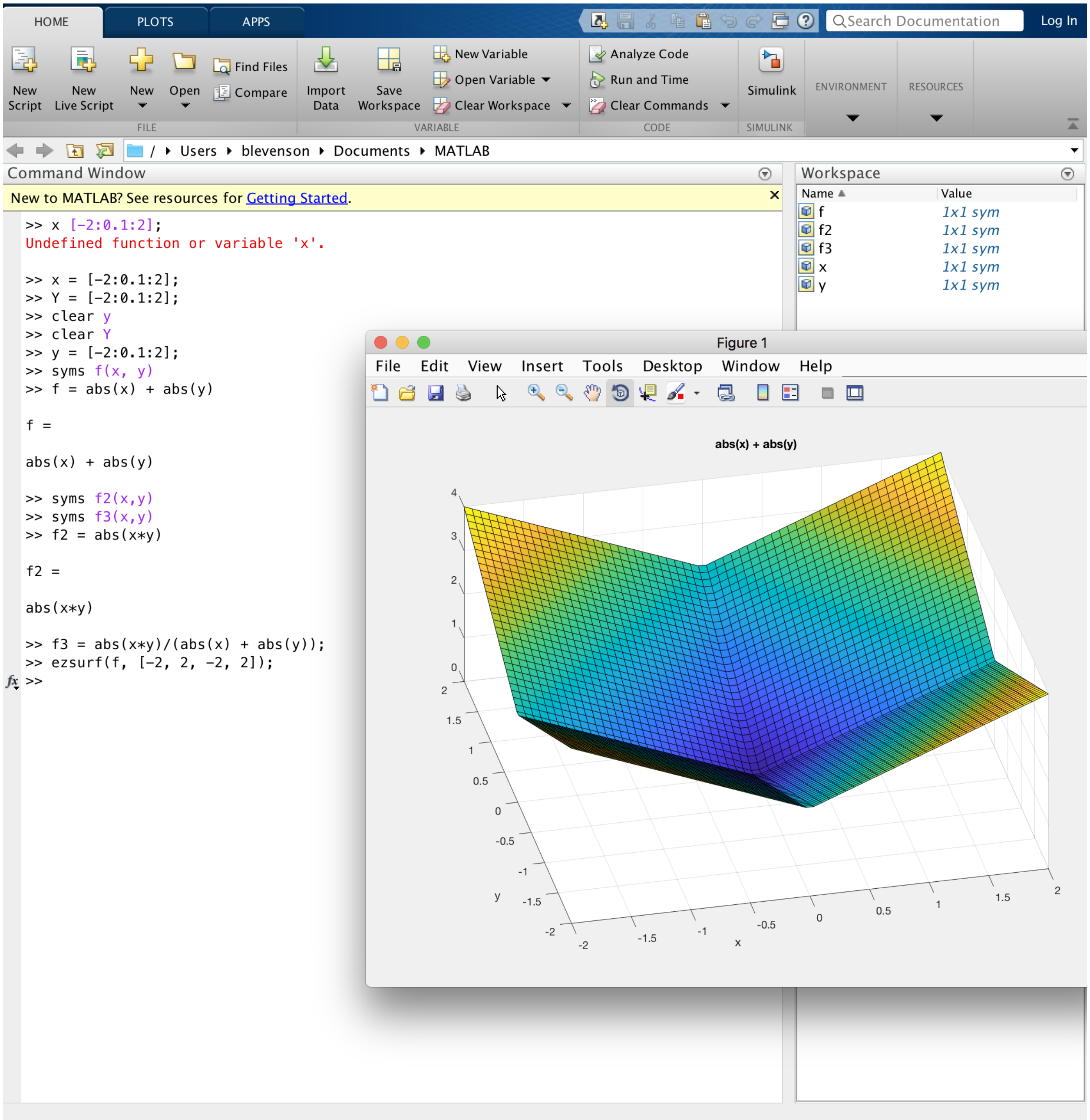
Brett Levenson, Andy Poulos, Rishabh Shah, John Stefan
October 2, 2017
Lab 2

Exercise One:

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New Variable
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SIMULINK
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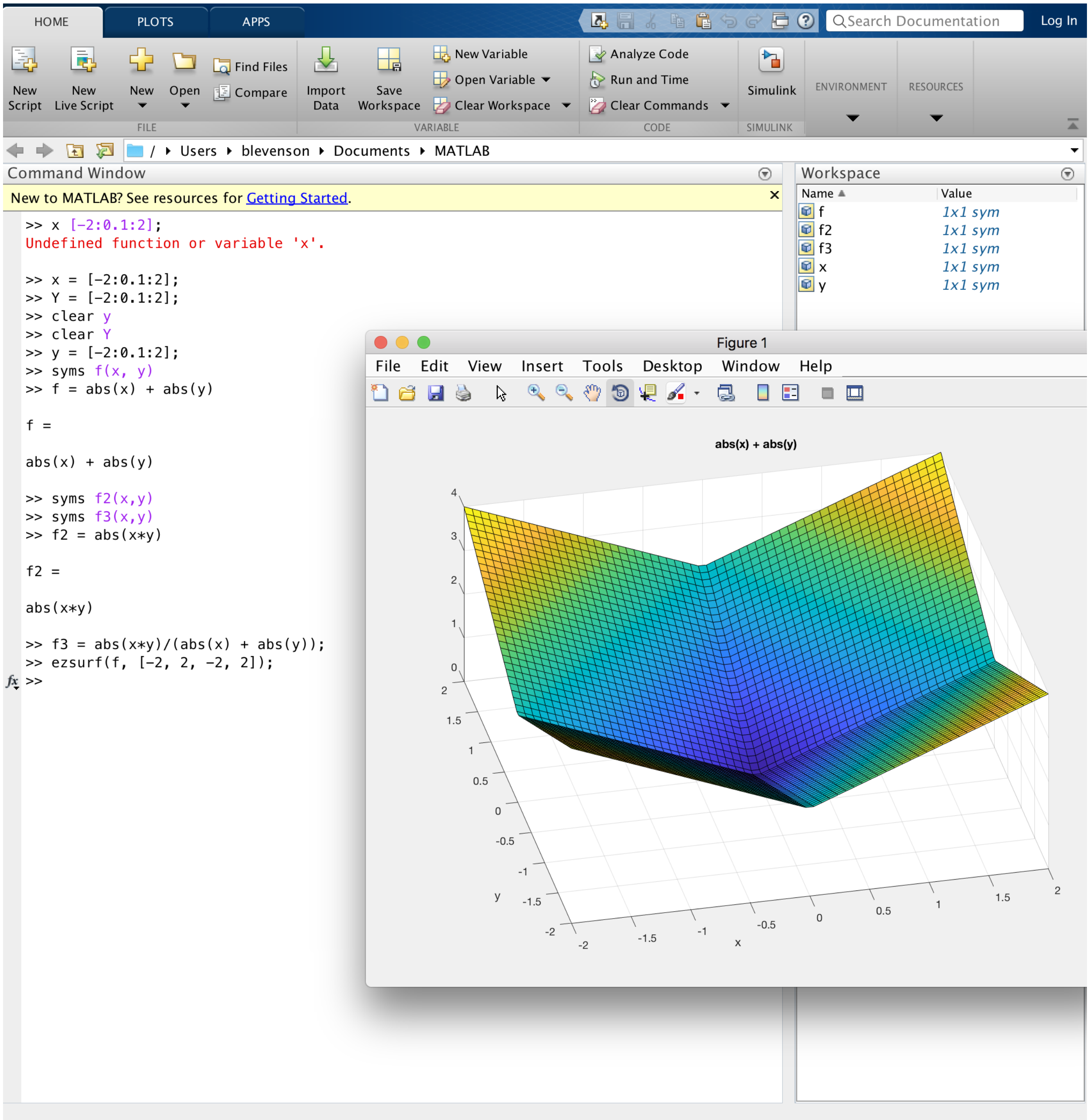
Command Window
New to MATLAB? See resources for Getting Started.
>> x [-2:0.1:2];
Undefined function or variable 'x'.
>> x = [-2:0.1:2];
>> Y = [-2:0.1:2];
>> clear y
>> clear Y
>> y = [-2:0.1:2];
>> syms f(x, y)
>> f = abs(x) + abs(y)
f =
abs(x) + abs(y)
>> syms f2(x,y)
>> syms f3(x,y)
>> f2 = abs(x*y)
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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Window
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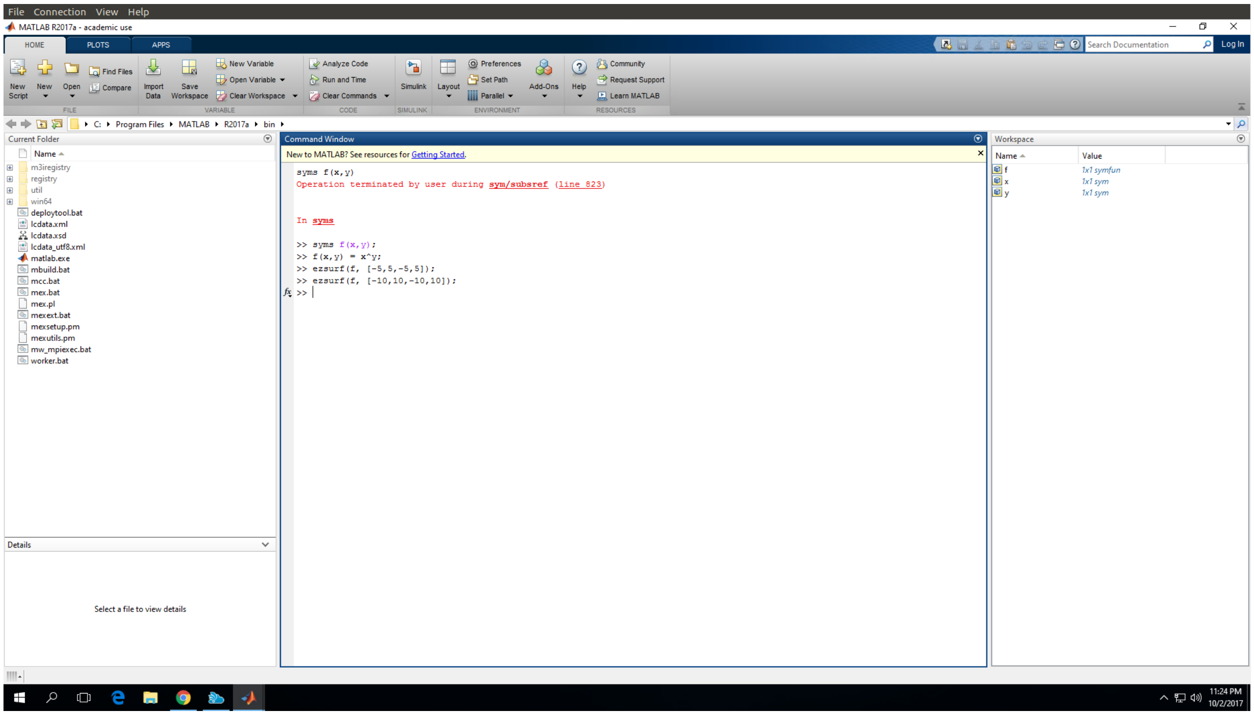
abs(x) + abs(y)
x
y

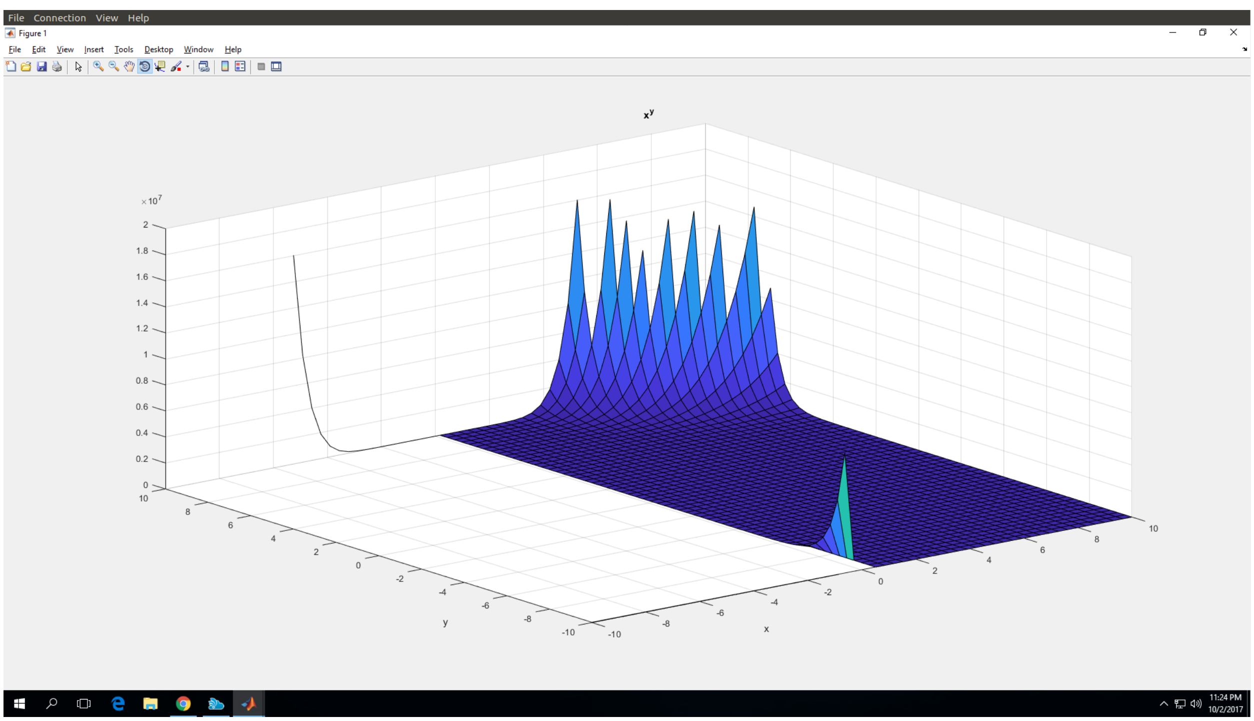
Exercise Two:

```
>> 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 organ. 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 $y=\gamma(x)$ 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.