**A Quick Guide to 3D Plotting with MATLAB, Mathematica, and Wolfram Alpha**

We want a surface plot and a plot of the level curves of

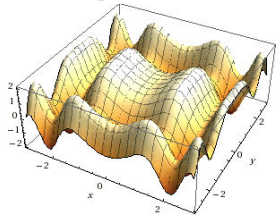
$$f(x,y) = \sin(x^2) + \cos(y^2) \quad \text{for} \quad (x,y) \in [-\pi,\pi] \times [-\pi,\pi]$$

- **Wolfram Alpha: (www.wolframalpha.com)**
  Type using plain language what you want. For example:

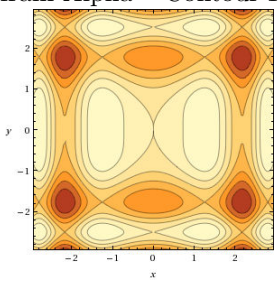
```
3D plot of sin(x^2)+cos(y^2) for {x,-Pi,Pi} and {y,-Pi,Pi}
```

  This gives the surface plot and the contour plot for the function.

Wolfram Alpha – Surface Plot:



Wolfram Alpha – Contour Plot:

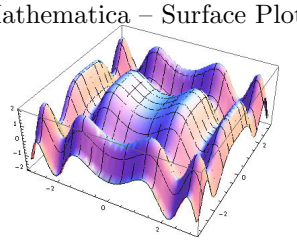


- **Mathematica:** (you have access to Mathematica in the MERC lab (NC 4015))
  Type the following:

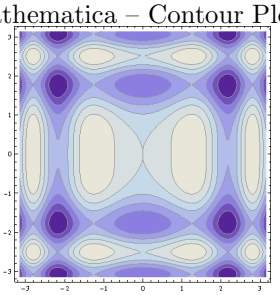
```
f[x_,y_]=Sin[x^2] + Cos[y^2];
Plot3D[f[x,y],{x,-Pi,Pi},{y,-Pi,Pi}]
ContourPlot[f[x,y],{x,-Pi,Pi},{y,-Pi,Pi}]
```

  Note: Mathematica uses capital letters for any built-in function (like sine, cosine, plot, etc.).
  Press Shift-Enter to evaluate what you have typed.

Mathematica – Surface Plot:



Mathematica – Contour Plot:



- **MATLAB:** (you have access to MATLAB in the MERC lab (NC 4015))
  Start a new document in MATLAB and type the following commands.

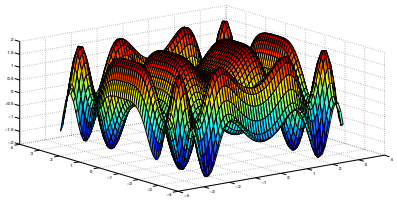
```
clear;
dx=0.1; dy=0.1;
[x,y] = meshgrid(-pi:dx:pi,-pi:dy:pi);
f = sin(x.^2) + cos(x.^2);
surf(x,y,f)
contour(x,y,f)
```

Note: Everything in MATLAB is seen as a matrix.

The `meshgrid` command defines the domain: $x$ in $-\pi$ by $dx$ to $\pi$, and $y$ in $-\pi$ by $dy$ to $\pi$.

Save your file and press the green *play* button at the top of the editor (or simply press ctrl-enter)

MATLAB – Surface Plot:



MATLAB – Contour Plot: