Computing for Scientists - Lab 5

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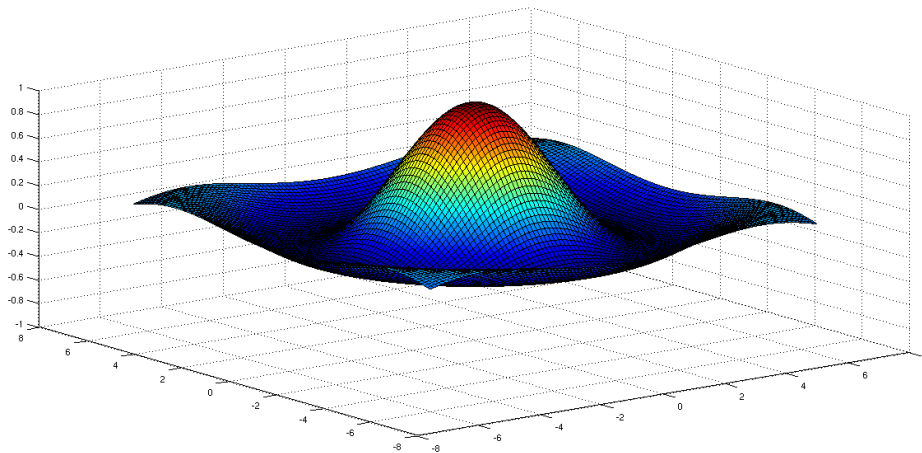
April 24, 2018

1 Problem 1 (50 points)

For this problem, you will plot and animate the following 2D function:

$$f(x, y, t) = \frac{sin(\sqrt{x^2 + y^2 + t})}{\sqrt{(x^2 + y^2 + t)}} \qquad (1)$$

The spatial domain (x's and y's) is obtained using the `meshgrid` function, and it ranges from -2π to 2π with 100 in each dimension, using `linspace`). Below is a plot of the function with $t = 0$:

Step 1 To plot, you use the *surf* command. To animate, you will create a 400-vector with values between 0 and 2π, which you will loop through using a `for`-loop and plot. You will have to fix the z-limits of the plot to $[-1, 1]$ for the animation to not be "jittery". You can also have fixed x and y limits to $[-10, 10]$.
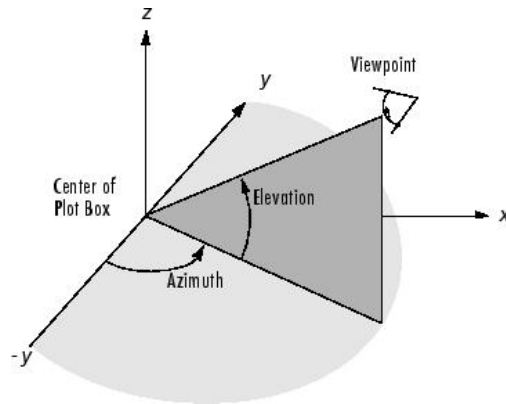
Figure 1: The view command specifies the viewpoint by defining azimuth and elevation with respect to the axis origin. Azimuth is a polar angle in the x-y plane, with positive angles indicating counterclockwise rotation of the viewpoint. Elevation is the angle above (positive angle) or below (negative angle) the x-y plane.

Step 2   You can alter how the 3D plot is viewed by using the `view` command. This command takes two arguments: *azimuth* and *elevation* in degrees. You will animate *azimuth* using the same variable used to animate t, but you will have to scale it for the rotation to be significant. The elevation should be fixed to 25. This second animation will have the effect of moving the camera around the plot.

Due dates

MATLAB script file due before class ends on Thursday, April 26th. 6