MATH 3341 — Spring 2020

Lab 10: MATLAB 3D Plots

Download `Math.3341.Lab.10.zip`, unzip it by following the Windows Instructions on WyoCourses. Change the current working directory of MATLAB to the unzipped folder, and type `edit lab_10_script` in the Command Window.

1 Define Meshgrid and Evaluate Function at Meshgrid

(a) Define an anonymous function `f` using the following formula:

$$f(x, y) = \pi^2[\sin(\pi x) + 4\sin(2\pi x) + \sin(\pi y) + 4\sin(2\pi y)].$$

(b) Define both `x` and `y` starting from -1 to 1 with 30 points using `linspace`.

(c) Create meshgrid by `[X, Y] = meshgrid(x, y);`

(d) Evaluate $f(x, y)$ at the mesh grid by `Z = f(X, Y)`.

2 Mesh Plots

(a) Run the script `lab_10_script.m`.

(b) Mimick the first subplot to create subplot 2, use `meshc(Z)` instead of `mesh(Z)`, change the colormap to `winter` and also change the title to be `winter` as well.

(c) Repeat the above step to create subplot 3 with `mesh(x, y, Z)` and colormap to be `pink`.

(d) Repeat the above step to create subplot 4 with `mesh(Z)` and colormap to be `prism`. Add `hidden off` to the line below the last line.

3 Surf Plots

Repeat Part 2 to create 4 subplots.

(a) For subplot 1, change `mesh(Z)` to `surf(Z)`.

(b) For subplot 2, change `meshc(Z)` to `surfc(Z)`.

(c) For subplot 3, change `mesh(x, y, Z)` to `surf(x, y, Z)`.

(d) For subplot 4, change `mesh(Z)` to `surf(Z)`.

At last, run the script `lab_10_script.m`, it might take some time to save the figures. You will upload the script file `lab_10_script.m`, and two figure files `lab_10_figure_1.pdf`, `lab_10_figure_2.pdf` to Overleaf, and in `body.tex` change the caption for each figuer. Recompile, and submit the generated .pdf file on WyoCourses.