

Lab 10: MATLAB 3D Plots

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1 SCRIPT AND OUTPUT

1.1 FIGURES

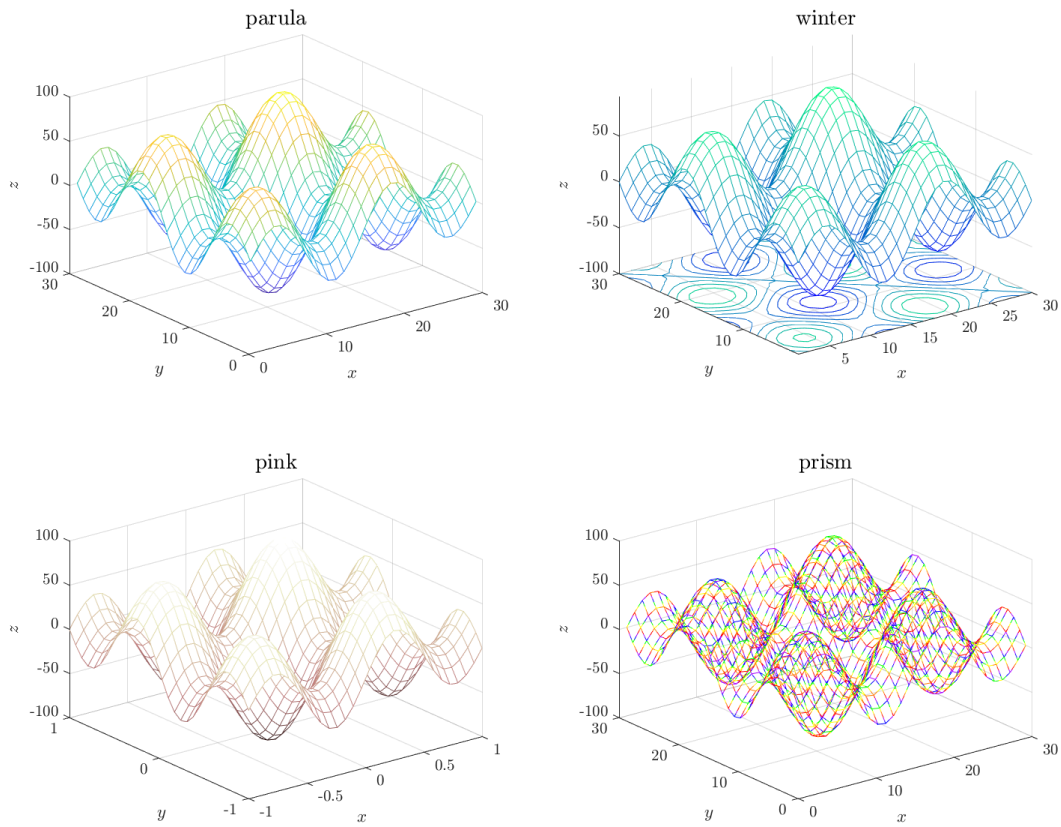


Figure 1: Mesh Plots

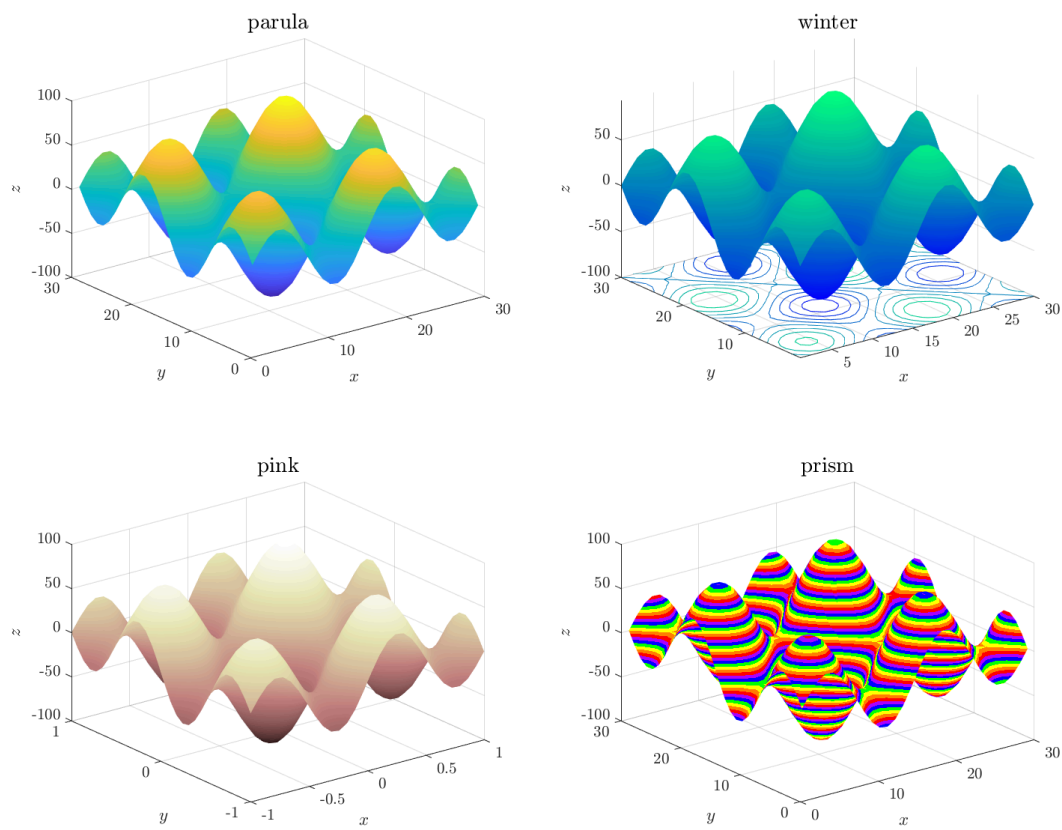


Figure 2: Surf Plots

1.2 SCRIPT FILE: lab_10_script.m

```
1 % Math 3341, Fall 2021
2 % Lab 10: MATLAB 3D Plots
3 % Author: Melissa Butler
4 % Date: 11/01/2021
5
6 clear; close all; clc;
7 set(groot,'defaulttextinterpreter','latex');
8 set(groot, 'defaultAxesTickLabelInterpreter','latex');
9 set(groot, 'defaultLegendInterpreter','latex');
10
11 %% 1 Define Meshgrid and Evaluate Function at Meshgrid
12 % 1(a)
13 f = @(x,y) pi^2 * (sin(pi * x) + 4 * sin(2 * pi * x) +...
14     sin(pi * y) + 4 * sin(2 * pi * y));
15 % 1(b)
16 x = linspace(-1, 1, 30);
17 y = linspace(-1, 1, 30);
18 % 1(c)
19 [X, Y] = meshgrid(x, y);
20 % 1(d)
21 Z = f(X, Y);
22
23 %% 2 Mesh Plots
24 figure(1); set(gcf, 'Position', [100 100 800 600]);
25
26 subplot(2,2,1)
27 mesh(Z)
28 colormap(gca, parula)
29 shading interp
30 title('parula','FontSize',14)
31 xlabel('$x$'), ylabel('$y$'), zlabel('$z$')
32
33 % 2(b)
34 subplot(2,2,2)
35 meshc(Z)
36 colormap(gca, winter)
37 shading interp
38 title('winter','FontSize',14)
39 xlabel('$x$'), ylabel('$y$'), zlabel('$z$')
40
41 % 2(c)
42 subplot(2,2,3)
43 mesh(x, y, Z)
44 colormap(gca, pink)
45 shading interp
46 title('pink','FontSize',14)
47 xlabel('$x$'), ylabel('$y$'), zlabel('$z$')
48
49 % 2(d)
50 subplot(2,2,4)
51 mesh(Z)
52 colormap(gca, prism)
```

```
53 shading interp
54 title('prism','FontSize',14)
55 xlabel('$x$'), ylabel('$y$'), zlabel('$z$')
56 hidden off
57
58 %% Surf Plots
59 figure(2); set(gcf, 'Position', [900 100 800 600]);
60
61 % 3(a)
62 subplot(2,2,1)
63 surf(Z)
64 colormap(gca, parula)
65 shading interp
66 title('parula','FontSize',14)
67 xlabel('$x$'), ylabel('$y$'), zlabel('$z$')
68
69 % 3(b)
70 subplot(2,2,2)
71 surfc(Z)
72 colormap(gca, winter)
73 shading interp
74 title('winter','FontSize',14)
75 xlabel('$x$'), ylabel('$y$'), zlabel('$z$')
76
77 % 3(c)
78 subplot(2,2,3)
79 surf(x, y, Z)
80 colormap(gca, pink)
81 shading interp
82 title('pink','FontSize',14)
83 xlabel('$x$'), ylabel('$y$'), zlabel('$z$')
84
85 % 3(d)
86 subplot(2,2,4)
87 surf(Z)
88 colormap(gca, prism)
89 shading interp
90 title('prism','FontSize',14)
91 xlabel('$x$'), ylabel('$y$'), zlabel('$z$')
92 hidden off
93
94 %% Save figures
95 for i = 1:2
96     fig = figure(i);
97     fig.PaperPositionMode = 'auto';
98     pos = fig.PaperPosition;
99     fig.PaperSize = [pos(3) pos(4)];
100     filename = sprintf('lab_10_figure_%d.pdf', i);
101     print(fig, '-dpdf', filename)
102 end
```