MATH 3341: Introduction to Scientific Computing Lab

Libao Jin

University of Wyoming

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Lab 10: MATLAB 3D Plots

mesh and surf

meshgrid Cartesian grid in 2-D/3-D space

`[X,Y] = meshgrid(xgv,ygv)` replicates the grid vectors xgv and ygv to produce the coordinates of a rectangular grid (X, Y). The grid vector xgv is replicated numel(ygv) times to form the columns of X. The grid vector ygv is replicated numel(xgv) times to form the rows of Y.

mesh 3-D mesh surface.

- `mesh(X,Y,Z,C)` plots the colored parametric mesh defined by four matrix arguments. The view point is specified by VIEW. The axis labels are determined by the range of X, Y and Z, or by the current setting of AXIS. The color scaling is determined by the range of C, or by the current setting of CAXIS. The scaled color values are used as indices into the current COLORMAP.
- `mesh(X,Y,Z)` uses C = Z, so color is proportional to mesh height.
- `mesh(Z)` and `mesh(Z,C)` use x = 1:n and y = 1:m. In this case, the height, Z, is a single-valued function, defined over a geometrically rectangular grid.

surf 3-D colored surface

- `surf(X,Y,Z,C)` plots the colored parametric surface defined by four matrix arguments. The view point is specified by VIEW. The axis labels are determined by the range of X, Y and Z, or by the current setting of AXIS. The color scaling is determined by the range of C, or by the current setting of CAXIS. The scaled color values are used as indices into the current COLORMAP. The shading model is set by SHADING.
- `surf(X,Y,Z)` uses C = Z, so color is proportional to surface height.
- `surf(Z)` and `surf(Z,C)` use x = 1:n and y = 1:m. In this case, the height, Z, is a single-valued function, defined over a geometrically rectangular grid.

surfc Combination surf/contour plot.

- surfc(...) is the same as SURF(...) except that a contour plot is drawn beneath the surface.

colormap Color look-up table

- `colormap(MAP)` sets the current figure's colormap to MAP.
- Built-in colormaps: `parula`, `jet`, `hsv`, `hot`, `cool`, `sprint`, `summer`, `autumn`, `winter`, `gray`, `bone`, `copper`, `pink`, `lines`, `colorcube`, `prism`, `flag`, `white`.