CEE 4020 - Computer Applications in CEE

Points & Surfaces

September 11, 2013

Managing Point Data

Objective: (1) Import points from a text file (2) Create point groups (3) Edit and query points and (4) Using transparent commands with points to create geometry (5) Create point tables
  Follow these steps:

- Import points from the attached PNEZD file - be sure to customize the text file while reading it in.

- Create distinct point groups as you import *points* and *more points*

- Edit point styles and point labels

- Draw a line using point numbers 295, 300 and 296.

- Draw new points using the *Create Points* menu as follows:

    - Draw an arc using points 181, 38 and 65
    - Create a new point using *Station/offset Object* - choose the arc, offset 20 and elevation 265
    - Create a new point using *Along line/Curve* along the arc you just drew at a distance of 25 from the point 65
    - Interpolate between points 24 and 61.
    - Create 6 points between points 24 and 173 at an offset of 20
    - Interpolate between points 182 and 215 at increments of 0.5' elevation and 5 unit distance and offset of -10

- Creating a point table: Use the Add Tables command in the Points menu.

- Create a point group containing only points with elevation less than 265'.

Creating, Editing and Analyzing Surfaces

Objective: Building surfaces by importing and adding points, from breaklines and from blocks. Editing surfaces, conducting simple analysis and appropriately displaying all information.
  Follow these steps to develop a surface from points:

- Import the *more_points.txt* file and develop a surface from it.

- Conduct an elevation and contour analysis

- Ensure that all the surface analysis information, including contour, elevation, slopes and water shed information is displayed appropriately. Control settings to ensure appropriate surface information display.

- Create a layout using viewport and display the developed surface.

Download the file from the class website:

- Create new surface called *Existing ground* on a new layer called *C_Topo* with suffix option as *-**.

- Add breaklines with the standard option. Use the Proximity option when using 2D polylines that have points with elevation at each vertex in the pline. The Wall option is used to represent vertical components.

- Define Mid-ordinate distance as 1.000′. This defines the shortest chord length between 3D curve features.

- Check for errors - zoom to them and rectify if necessary.

- Next add the blocked points using *Add Objects*

- Examine surface properties

Editing surfaces:

- Display triangles and remove any unnecessary triangles

- Use *Edit - Delete Line*

- Use the extract objects from surface feature to extract the boundary. Notice how you can grip edit the boundary.

- Add the new boundary to the surface and re-build the surface. Note changes.

- Surface smoothing

Summary: Generating Surfaces

Surfaces can be generated from

- Point files

- Points imported from Field book files

- Breaklines

- Objects

- DEM files

Make sure that the coordinate system is appropriately defined for all surfaces. Right click on the drawing name in the *Drawing Settings* tab to explicilty declare it.

Point Files

- Right click on Points - import points from a point file Remember to define a file type

  - PNEZ
  - How the inputs in each record is delimited ',' or 'space'
  - Define co-ordinate system
  - Load and parse to check for errors

- Import each point file into an individual point group.

Field book files

- Develop survey Database - this is a local DB

- Develop a Network in the survey DB

- Import a .fbk file into the DB

- Define Figure prefixes in Figure Prefix DB

- Ensure each figure prefix is associated with a Figure prefix style

- Insert points into drawing

- Insert figures into drawing - treat as Breaklines.

Breaklines

Download the file from the class website:

- Create new surface called *Existing ground* on a new layer called *C_Topo* with suffix option as -*.

- Add breaklines with the standard option. Use the Proximity option when using 2D polylines that have points with elevation at each vertex in the pline. The Wall option is used to represent vertical components.

- Define Mid-ordinate distance as 1.000′. This defines the shortest chord length between 3D curve features.

- Check for errors - zoom to them and rectify if necessary.

Objects

- Add the blocked points using *Add Objects* by right clicking on Objects.

DEM Files

- Add a DEM File using *Add DEM* by right clicking on DEM.

Editing and Analyzing Surfaces

Objective: Building surfaces by importing and adding points, from breaklines and from blocks. Editing surfaces, conducting simple analysis and appropriately displaying all information.

Follow these steps to develop a surface from points:

- Conduct an elevation and contour analysis

- Ensure that all the surface analysis information, including contour, elevation, slopes and water shed information is displayed appropriately. Control settings to ensure appropriate surface information display.

- Create a layout using viewport and display the developed surface.