

LAYERED CANOPY

Objectives: To illustrate the procedure for constructing 3D representations of vegetation using simple surfaces and swept shapes.

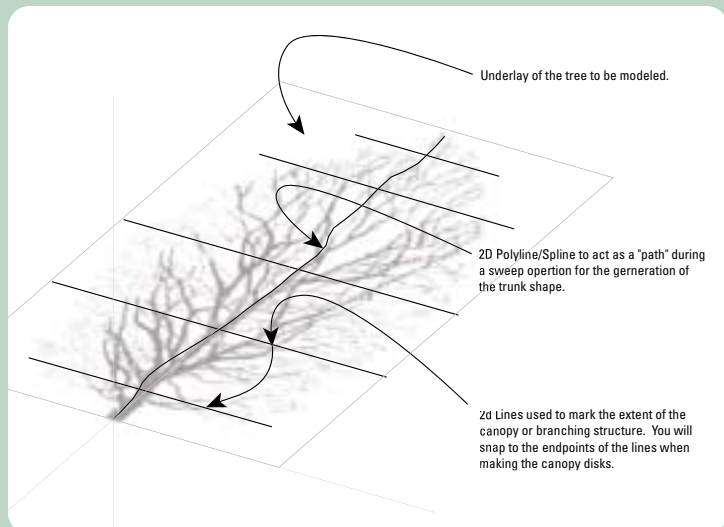
Inputs: Closed polygonal surface – complex or simple, polylines.

High resolution image of plant material to be modeled/rendered (*.tif, *.tga, *.jpg). For accurate branching and habit consult a reference such as Hightshoe's, "Native Trees Shrubs and Vines for Urban and Rural America."

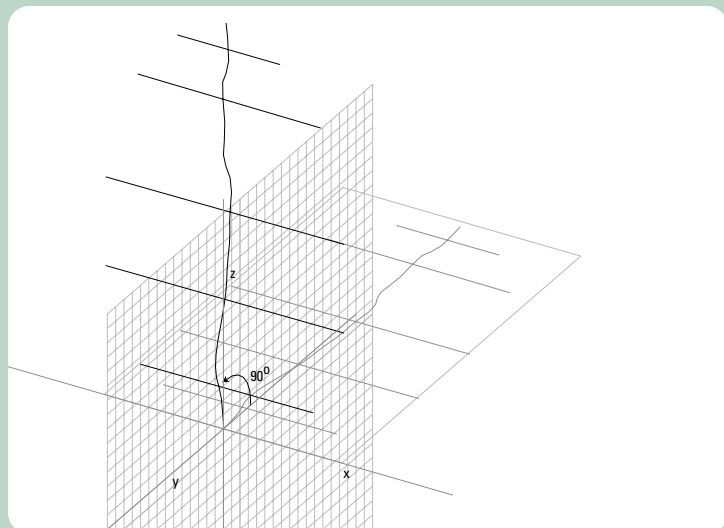
Note: When generating or scanning the image of the plant material to be represented, take note of whether or not the image or plant is symmetrical. Trees with a central leader, are more successfully represented in this manner when compared to the multistemmed forms of understory trees.

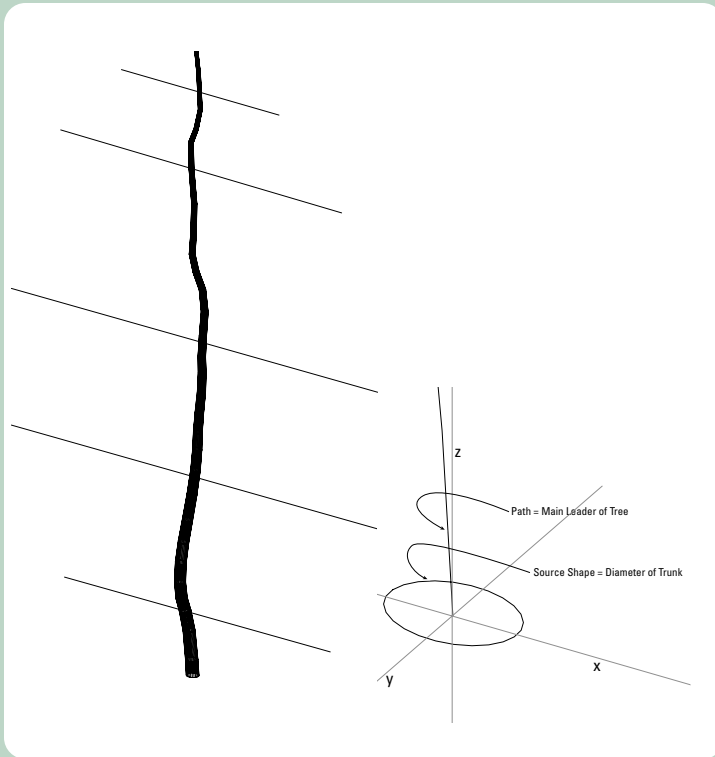


1. Place an underlay of the tree species that you wish to model into the XY construction plane of your model. Invoke either the polyline or line commands and trace the extent of the branching structure and trunk form in the XY construction plane using two separate layers.



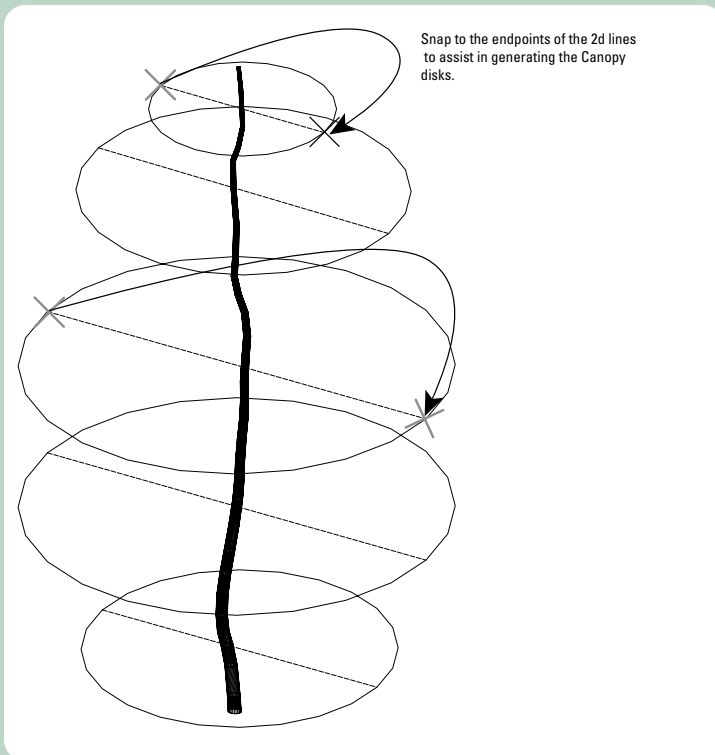
2. Rotate the entities 90 degrees around the YZ construction plane so that they are now perpendicular to the XY construction plane.





3. With either a closed polyline, circle, or ellipse, model the diameter of the trunk or branching structure.

4. Using the sweep command sweep the trunk profile along the traced path of the trunk or central leader. The resulting solid entity will be the trunk entity.

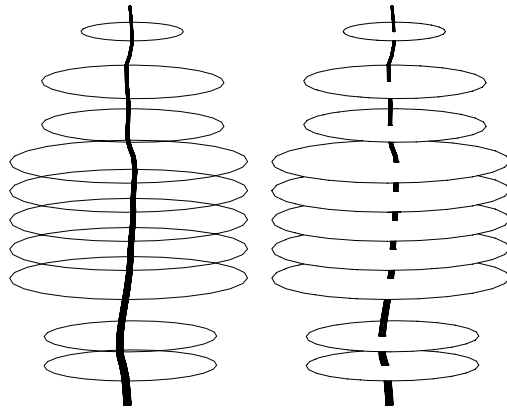


5. The line entities that represent the extent of the tree branching structure will be used as a guide in constructing the canopy disks. Make sure the XY construction plane is current and activate the endpoint snap.

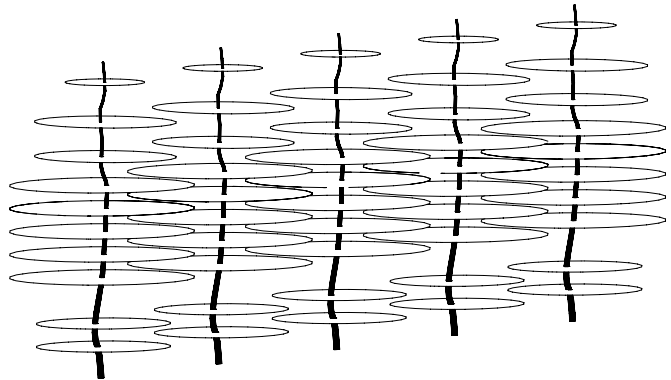
6. Using an ellipse, circle, or rectangle, generate a series of surfaces to represent the canopy. The "endpoint snap" will enable you to use the canopy extent entities as guides for constructing the geometry.

7. Anticipating material assignments in a rendering application, make sure that the canopy entities are on a different layer than the trunk entities.

8. This image compares a wire-frame representation with a hidden line view.



9. The entities can be grouped and replicated in the modeling or rendering application similar to a block and instances procedure in CAD applications.



10. These two images illustrate both the strength and the weakness of the layered canopy tree model. The eye level accentuates the thinness and planarity of the canopy entities, while the aerial view adequately represents the canopy coverage.

