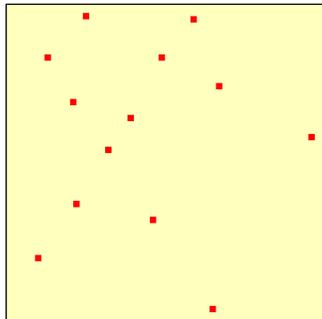
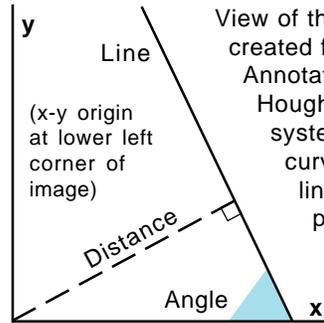


Inverse Hough Transform

The Hough Transform is a procedure for identifying linear features in imagery or in rasters depicting the distribution of point features. The procedure utilizes a transformation from normal x-y spatial coordinates to a specialized polar coordinate space. The Hough Transform process in TNTmips 6.6 (Process / Raster / Interpret / Hough Transform) has been expanded to perform the inverse transformation to normal coordinate space for designated positions in the Hough space raster. This new inverse procedure creates raster and vector objects containing the lines corresponding to the selected Hough space positions. Controls for the inverse Hough transform are found on the new Inverse tabbed panel in the Hough Transform window.

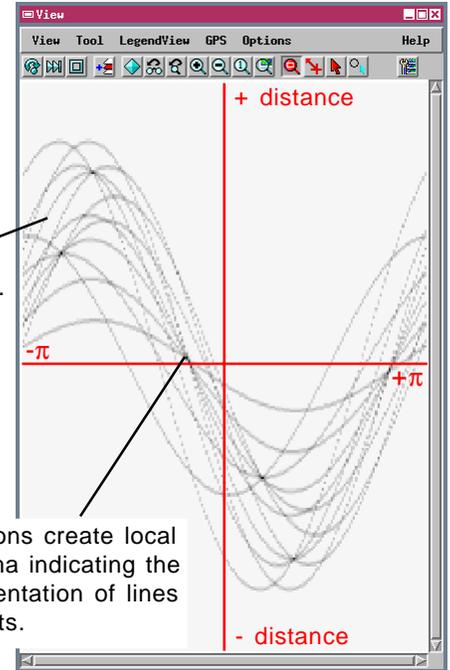


Input raster with points.



The Hough parameter space plots line orientation and position by distance from origin and angle with the x-axis as illustrated above.

View of the Hough Space raster created from the point raster at left. Annotations in red show the Hough space coordinate system. Each sinusoidal curve represents all possible lines through one of the points in the input raster.

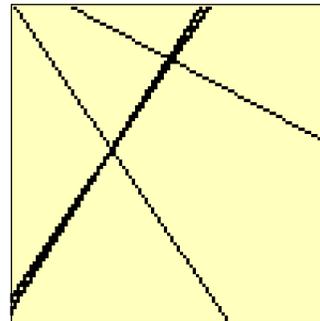


Curve intersections create local cell value maxima indicating the position and orientation of lines connecting points.

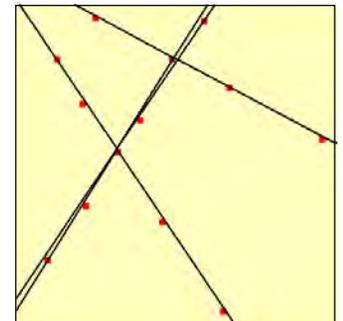
Each sinusoidal curve that crosses a cell in the Hough raster increments its value by 1. So a location where many curves cross (indicating Hough coordinates for a prominent linear feature) is a local cell value maximum. You can set a global minimum percentage threshold to identify all Hough raster positions from which to generate output lines, or use a Circle graphic tool to interactively identify individual local maxima corresponding to curve intersections.



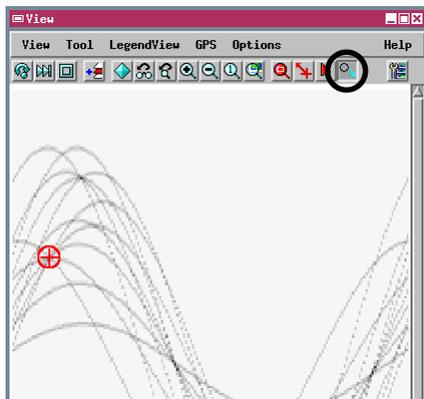
Turn on the Use Threshold toggle button and enter a percentage to set a global threshold for the Hough raster.



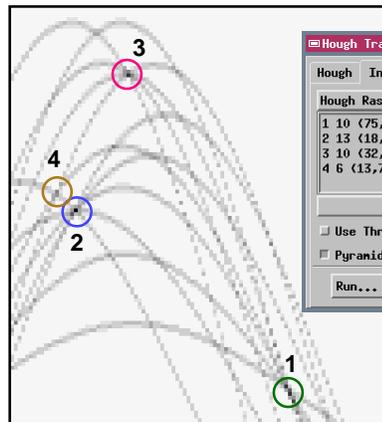
Inverse Hough raster created from the point raster shown above.



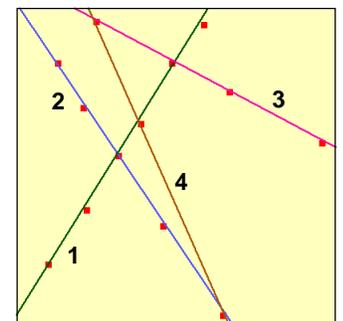
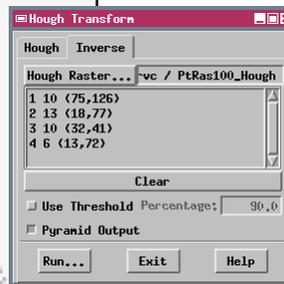
Inverse Hough vector overlaid on the input point raster. Two nearby local maxima created nearly coincident lines.



The circle tool in the Inverse Hough View window allows you to designate one or more curve intersections for the transform. Use the mouse to position the circle and change its radius, then click the right mouse button.



For each circle you place, the process finds the location of the local maximum value in the Hough raster and adds it to the list on the Inverse panel. This list shows the item number, cell value, and position in the Hough raster (column, line).



Input raster overlaid by vector lines produced by the inverse transform for the selected Hough raster locations. Line colors and numbers above are keyed to the circles shown in the Hough raster illustration to the left.