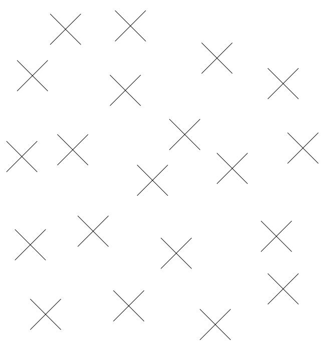
TPOPTRIA

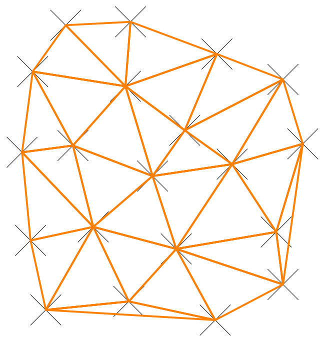
Draws best-fit 3D triangles (closed 3D polylines) based on a set of 3D points, optional boundaries and optional breaklines

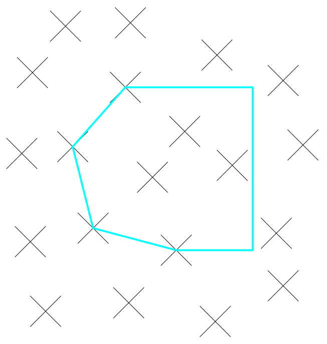
Before

After

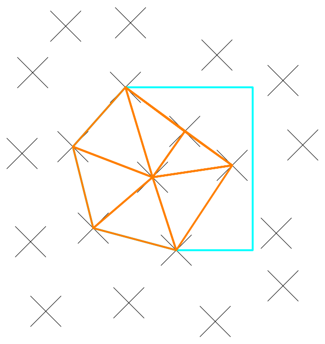


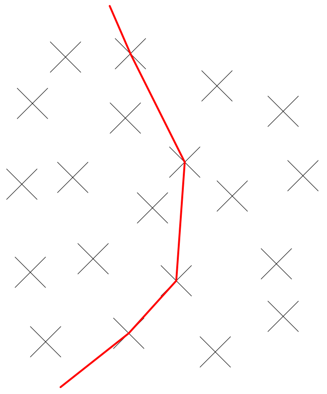
Example 1: Set of 3D points, no boundaries, no breaklines



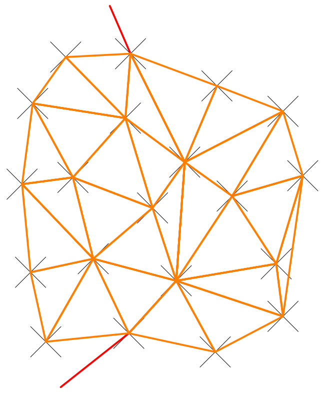


Example 2: Set of 3D points and a boundary (a closed 2D polyline)

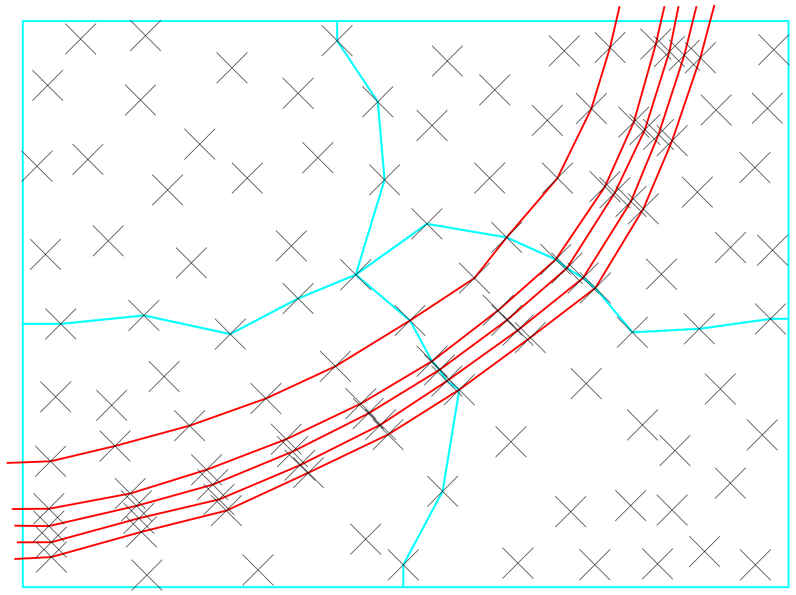




Example 3: Set of 3D points and a breakline (a 2D polyline) – compare results with Example 1

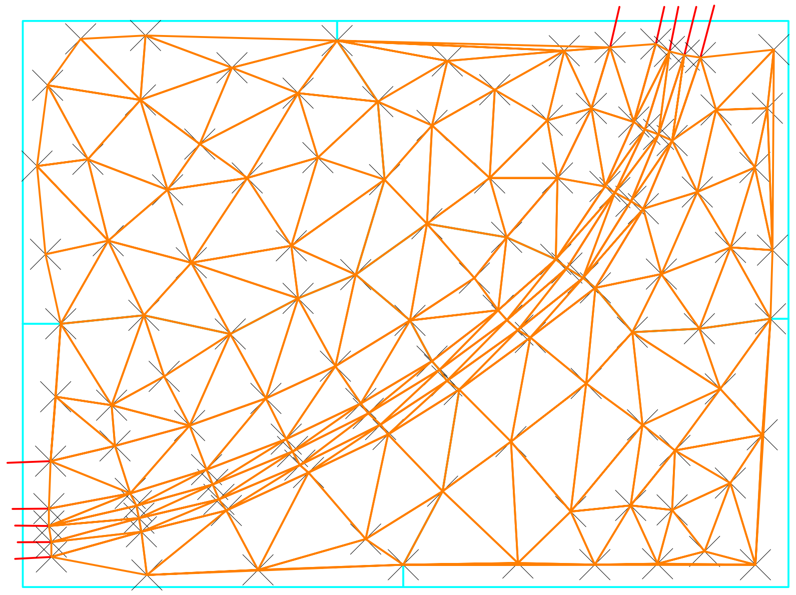


Before



Example 4: Set of 3D points, closed boundaries and breaklines

After

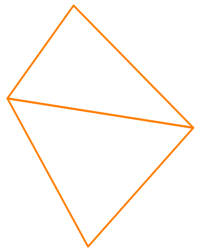


By dividing this example into four areas with four boundary polylines, it takes far less time to create the triangles than selecting all the 3D points together in one go

TPOPSWAP

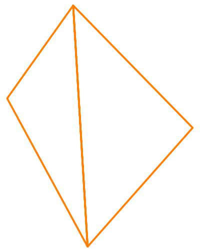
Swaps the shared edge between two adjacent 3D triangles (closed 3D polylines)

Before

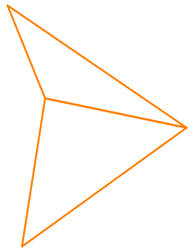


Example 1: Swapping the shared edge between two adjacent 3D triangles

After

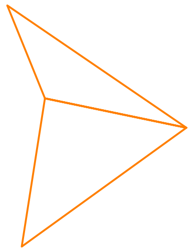


Before



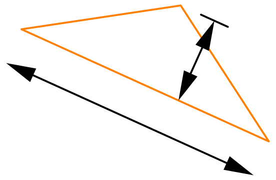
Example 2: The shared edge will not swap if the overall outline of the two triangles would change due to the swap (so no change between before and after)

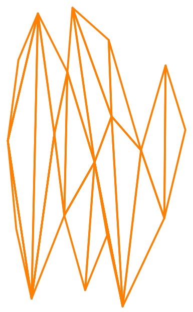
After



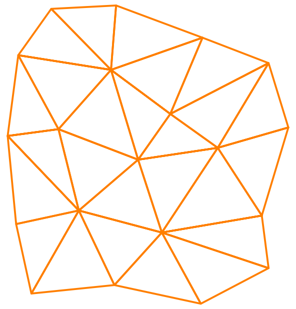
TPOPGETTHIN

Measures the minimum and maximum flatness ratio for a group of 3D triangles (closed 3D polylines). A triangle's flatness ratio is the 2D length of the longest side divided by the 2D perpendicular distance to the opposite point





Example 1: Flatter triangles return higher ratios
minimum ratio = 4.893
maximum ratio = 96.509

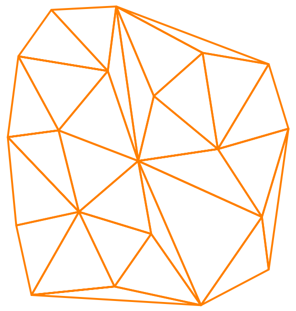


Example 2: Less flat triangles return lower ratios
minimum ratio = 1.242
maximum ratio = 2.487

TPOPDELTHIN

Deletes flat or near flat 3D triangles (closed 3D polyines) with the option to delete only triangles on the edge of the group

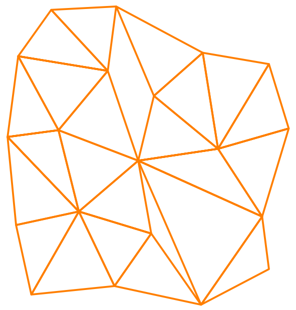
Before



28 triangles

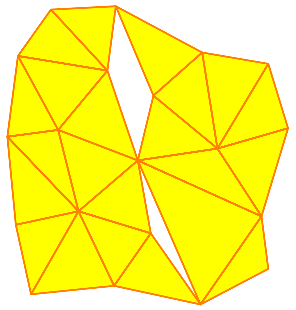
Example 1: Deleting all near or near flat 3D triangles with a ratio over 5.0

After

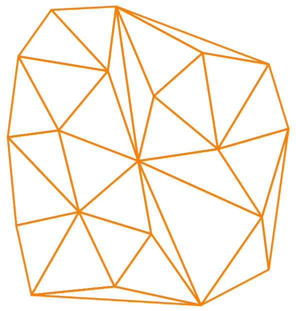


22 triangles

(with solids from TPOPSOLID added)

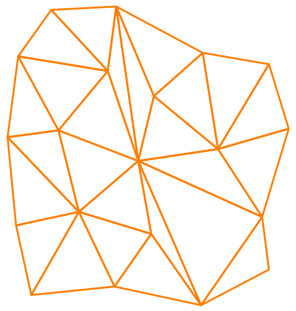


(flatter triangles within group also deleted)

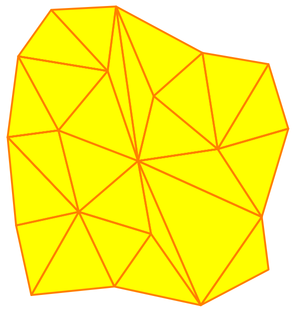


28 triangles

Example 2: Deleting near or near flat 3D triangles with a ratio over 5.0, but only if on the edge of the group (compare the total number of triangles to example 1)



25 triangles

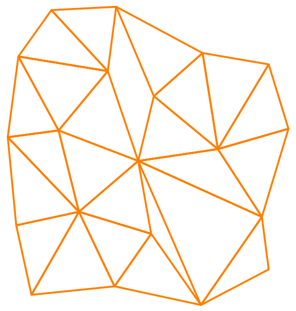


(flatter triangles within group not deleted)

TPOPSOLID

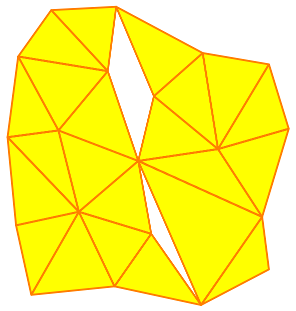
Draws 2D solid triangles based on a set of 3D triangles (closed 3D polylines). The z coordinate of each 2D solid can be either the average z coordinate of each 3D triangle, or the maximum slope of each triangle. There is also the option to copy the colours of the source 3D triangles

Before

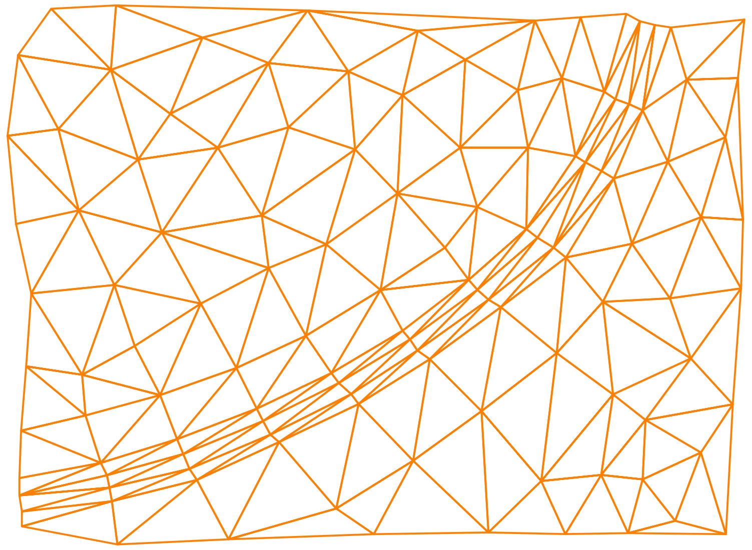


Example 1: Draw 2D solids to identify any missing 3D triangles within the group

After

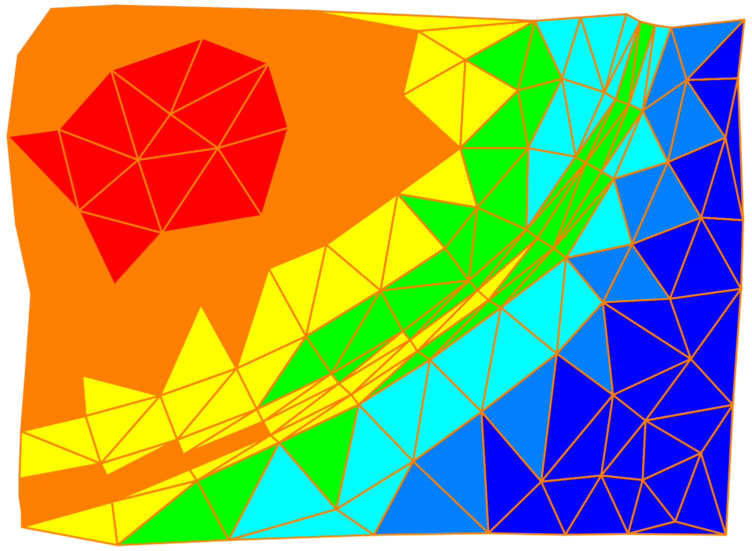


Before

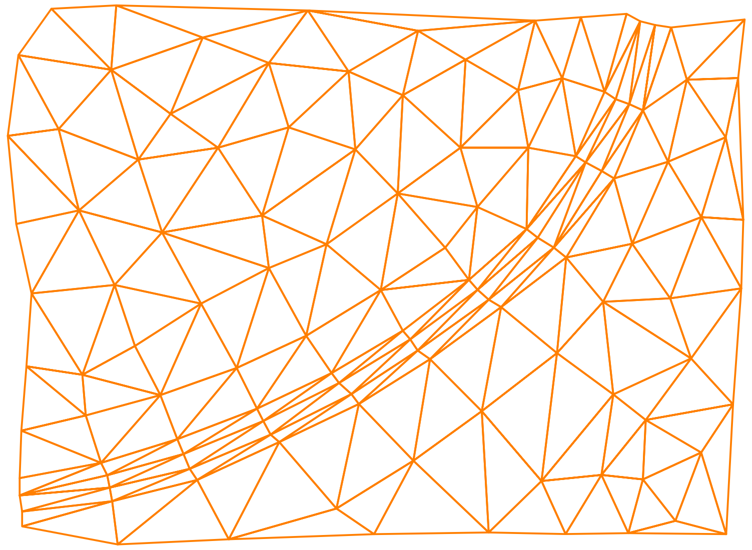


Example 2: Draw 2D solids with z coordinate based on each 3D triangle's z coordinate. When combined with COLOURBYZ this helps identify higher (red) and lower (blue) areas within the group of 3D triangles

After

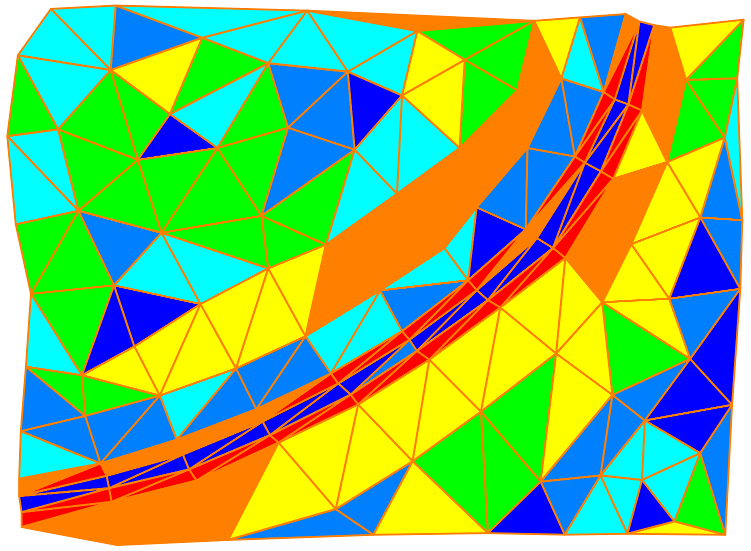


Before

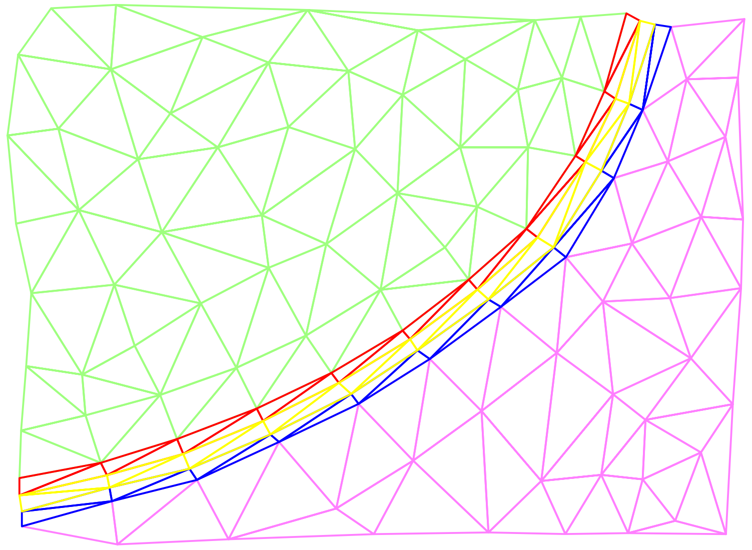


Example 3: Draw 2D solids with z coordinates based on each 3D triangle's maximum slope (expressed as a percentage, so for example 1 in 40 is 2.5%, and flat is 0%). When combined with COLOURBYZ this helps identify steeper (red) and flatter (blue) areas within the group of 3D triangles

After

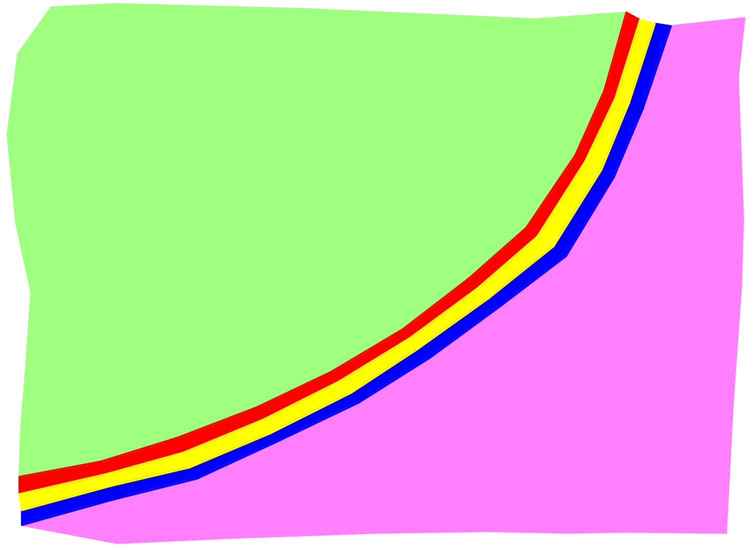


Before



Example 4: Draw 2D solids copying each 3D triangle's colour to create solid coloured areas across the group of 3D triangles

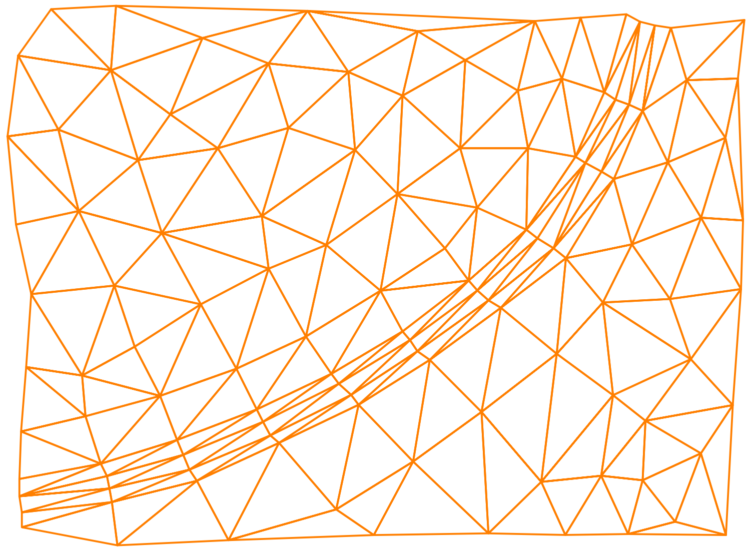
After



TPOPCONT

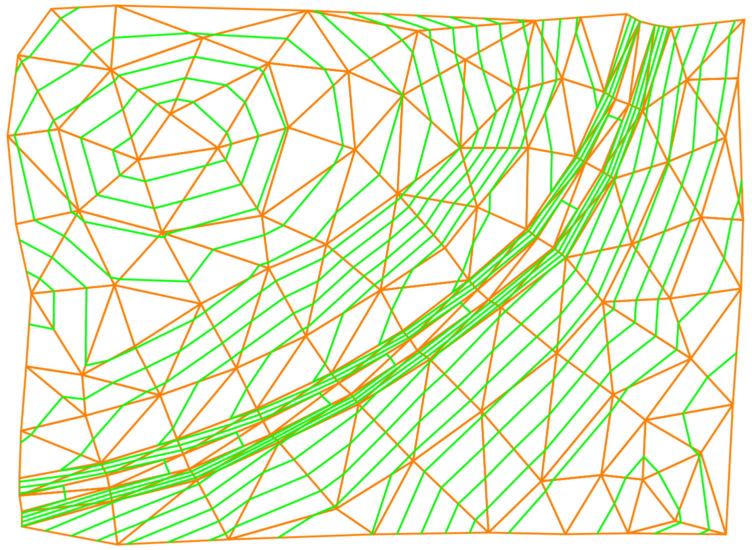
Draws contour lines (2D polylines) at user defined z intervals based on a set of 3D triangles (closed 3D polylines)

Before

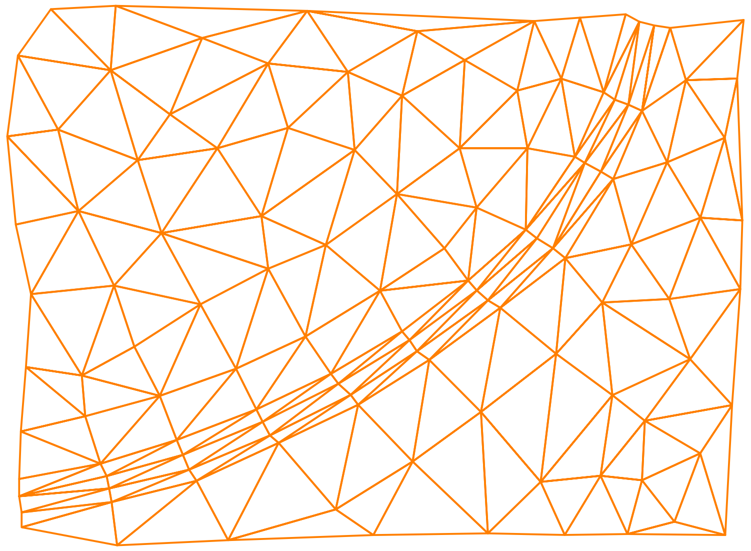


Example 1: Contour lines at 0.25 unit intervals

After

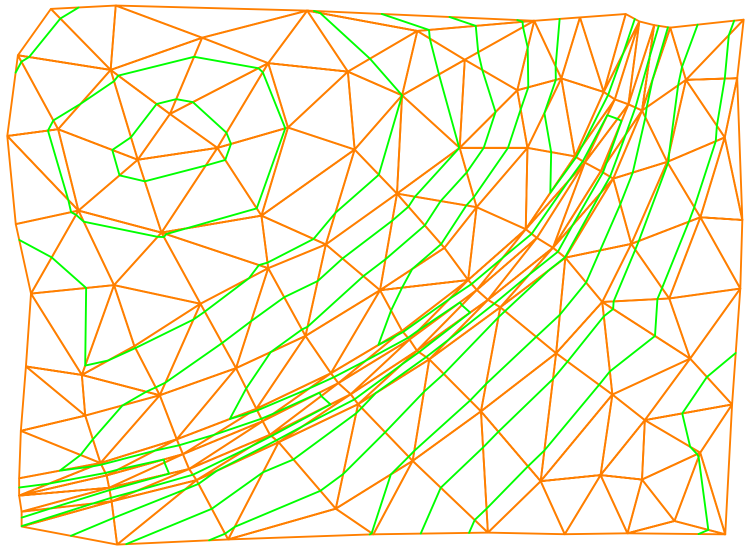


Before

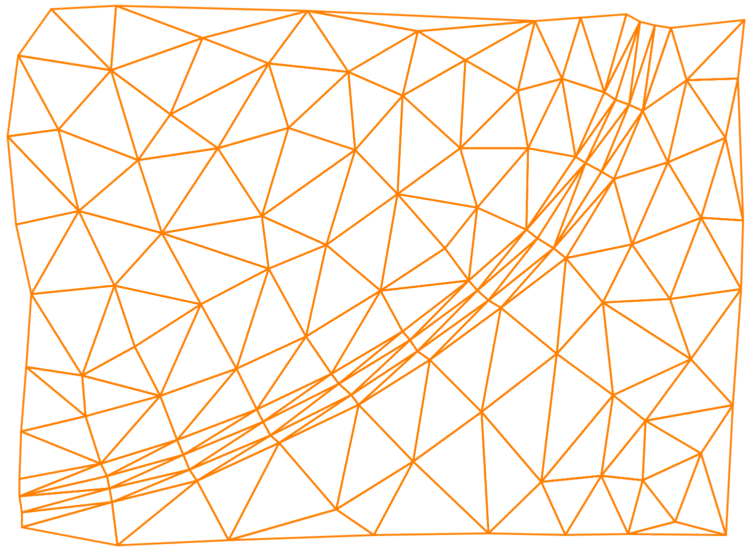


Example 2: Contour lines at 0.50 unit intervals

After

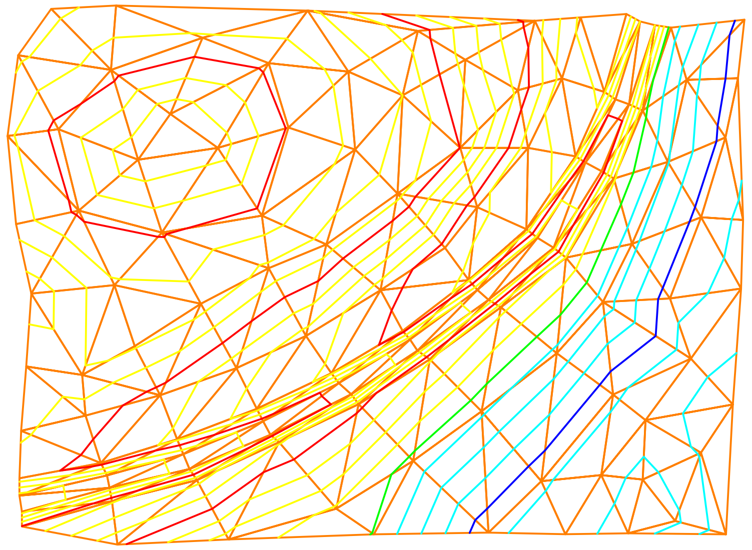


Before



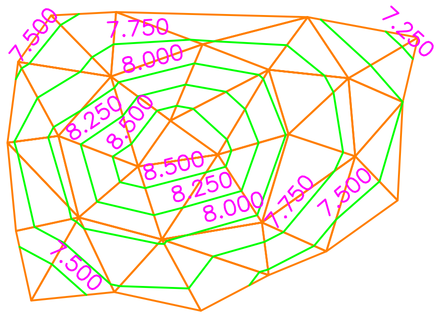
Example 3: Contour lines coloured with COLOURBYZ (in this example 1 unit major intervals, 0.25 unit minor intervals, 5 unit datum)

After

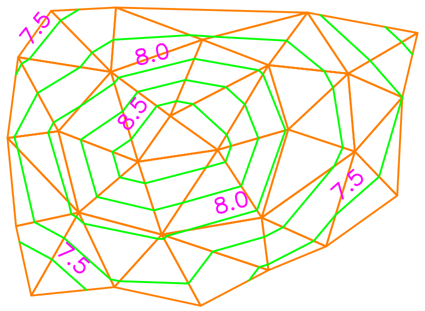


TPOPCONTLABEL

Draws text labels of contour (2D polyline) z value next to contour at user selected position. The text labels are automatically aligned to the nearest adjacent contour line segment. The user can specify the number of decimal places included in the text labels



Example 1: Contour z values (to 3 decimal places) next to contour lines

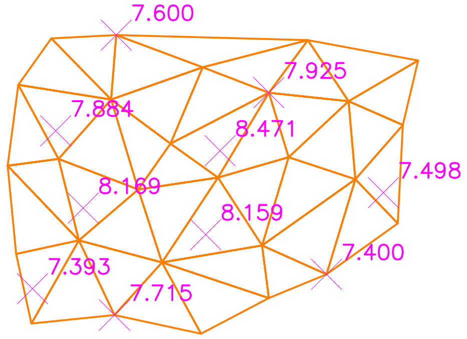


Example 2: Contour z values (to 1 decimal place) next to appropriate contour lines

TPOPLEVEL

Draws spot levels (text labels and points) at user selected locations within a group of selected 3D triangles (closed 3D polylines)

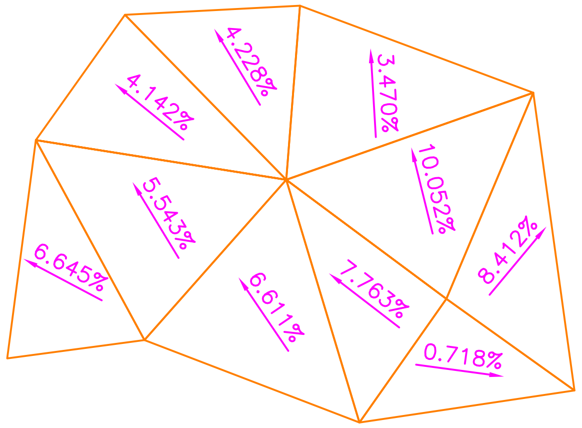
Example 1: Spot levels within a group of 3D triangles



TPOPSLOPEMAX

Draws maximum slope values (text labels) and direction of maximum slope (2D polyline arrows) within selected 3D triangles (closed 3D polylines)

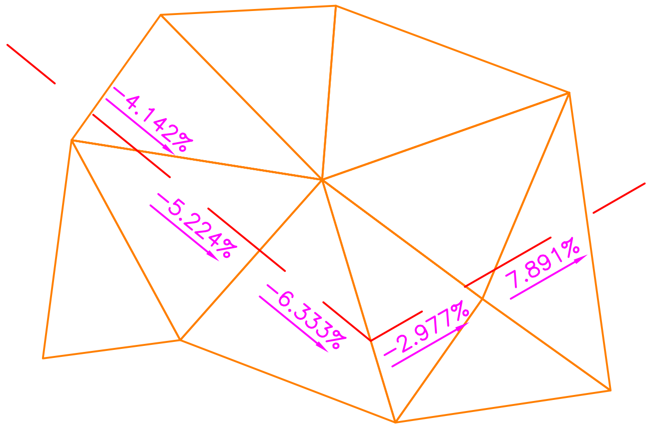
Example 1: Maximum slope values and direction for a group of 3D triangles



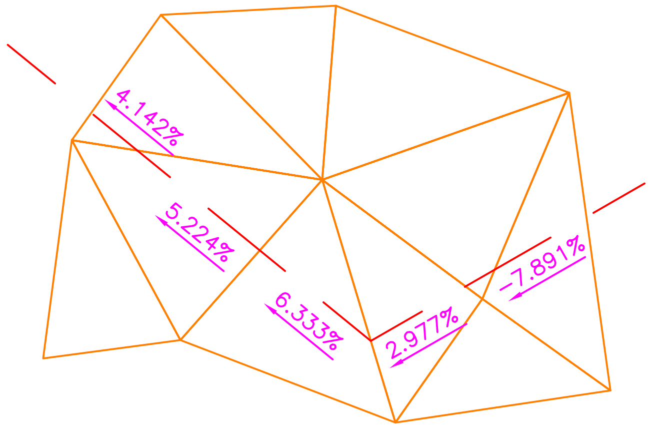
TPOPSLOPEDIR

Draws slope values (text labels) and arrows (2D polyline arrows) in user defined directions within selected 3D triangles (closed 3D polylines). Downhill slopes are positive, uphill slopes are negative

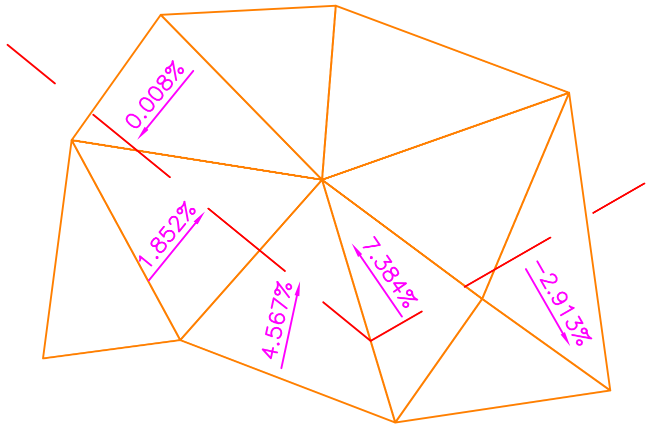
Example 1: Slope values in one direction, for example along the route of a proposed trench



Example 2: Slope values in the opposite direction (note values have switched signs)



Example 3: Slope values in a different direction for the same model

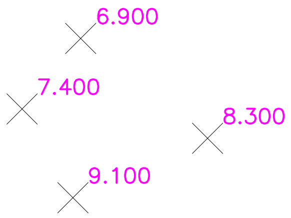


Note that these values will not necessarily be the same as the maximum slope values returned by TPOPSLOPEMAX as they are in different directions to the maximum slope

TPOPMULZ

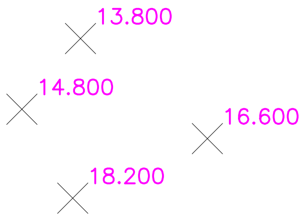
Multiplies the z coordinate values of selected 3D points by a user defined value. A value of less than 1 reduces z coordinate values. A negative value inverts the sign of the z coordinate values (note that numbers have been added in these example for clarity purposes. TPOPMULZ does not draw, nor change, these text objects)

Before



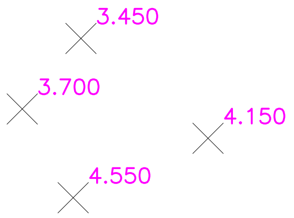
Example 1: 3D points with z coordinate values multiplied by 2

After



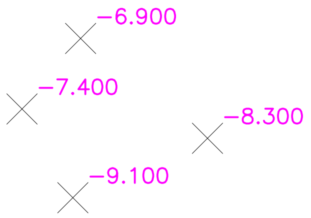
Example 2: 3D points with z coordinate values multiplied by 0.5

After



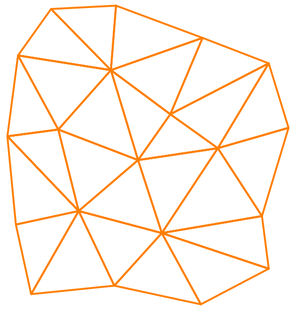
Example 3: 3D points with z coordinate values inverted by multiplying them by −1

After



TPOPVOL

Returns the volume between selected 3D triangles (closed 3D polylines) and a zero baseline (z = 0). TPOPVOL does not calculate cut and fill volumes separately. See TPOPINTERS for how to do this

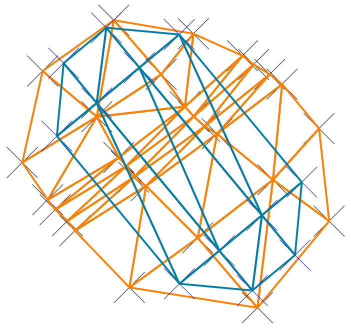


Example 1: The volume of these 3D triangles above a zero baseline is 9887.602 cubic units

TPOPINTERS

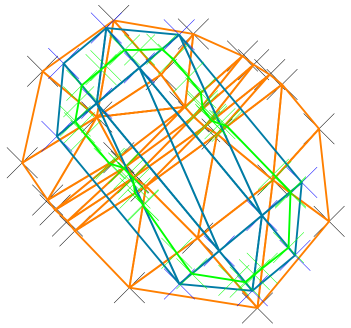
Draws 2D polylines and 3D points where two sets of 3D triangles (closed 3D polylines) intersect. It requires each set of 3D triangles to be on different layers. It can also help calculate cut and fill volumes when using TPOPVOL

Before

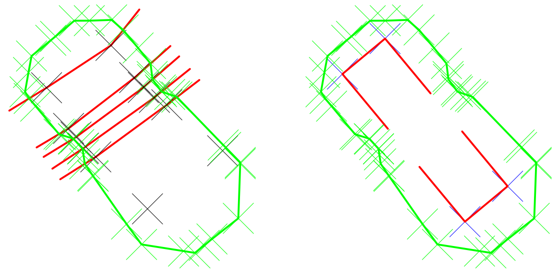


Example 1: Draws a polyline and 3D points (in green) where the two sets of 3D triangles intersect (one set is orange, the other set is blue)

After

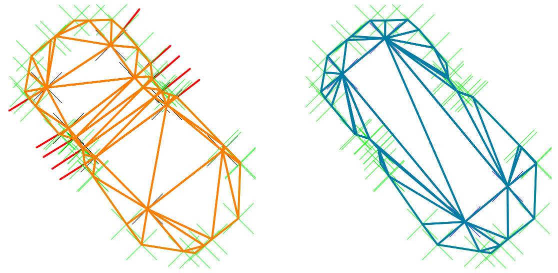


Before

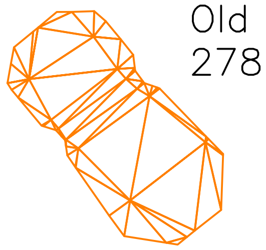


Example 2: Trim the two sets of 3D triangles to within the intersection polyline created in Example 1, and use TPOPTRIA on each set of triangles to create new models

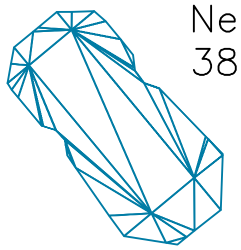
After



Example 3: Use TPOPVOL to calculate the volume for each model and obtain the cut or fill volume from these values (for this example it's 1023.357 cubic units of fill)



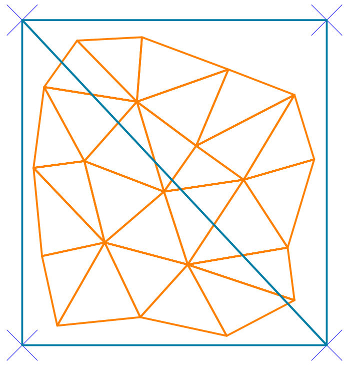
Old Volume
2780.397



New Volume
3803.754

Example 4: Determining where triangles intercept large flat slightly angled plane (consisting of two triangles to form a large sloping rectangle)

Before



After