Meshes can be coloured on the shortest distance from other meshes. This is useful when comparing actual outcomes against design for both underground and open pits, determining shotcrete thickness, compare deformation between detail scans etc.

Load the meshes of interest and hide any meshes that should not be used. Select "***Top toolbar => Brown colour palette icon => Colour on distance from mesh***" and pick the mesh to colour with the left mouse button. This mesh will be coloured based on the shortest distance to any other visible meshes.

Summary of additions over the past quarter
GEM4D:
1. Grid data loads 5-7 times faster.
2. Fit math surfaces to data.
3. Populate grids from the scene.
4. Automatically show statistics and charts.
5. Volume calculations.
6. Colour mesh on distance from other meshes.
7. Surface draping from any direction.
8. Extract mesh boundaries and edges.
9. Drill hole collars and surveys.
10. Interactive clipping widget.
11. Virtual clipping with Space bar.

Trajec3D:
1. Move to a new charts library.
2. Support for different language settings.

PhotoCoreLog:
1. Access to grid cells with a single mouse click.
2. Set unwarping resolution.
3. Support BRQD.
4. Add 5cm ruler.
5. Behind-the-scenes changes for future improvements.

FAQ

I decided to start this newsletter with questions I have been frequently asked over the past quarter.

Will BasRock software stay free of charge or become commercial at some point?
I have no intention to make BasRock commercial at this point, but could decide to in future. I commit to warn users at least 6 months in advance and will keep the software affordable.

How do I manage multiple geotechnical zones on a single photo in PhotoCorelog?
PhotoCoreLog is already useful, but an uncompleted package in many respects. I developed what I required for a project, and then got distracted with GEM4D. The main limitation is the logging of

multiple geotechnical zones on a single photograph. Much of the behind-the-scenes work is now completed and only require implementation. The new additions will allow flexible annotations and support multiple geotechnical zones on a photograph.

Norway - Why is Trajec3D is not working on my computer?
Users from Norway (and occasionally Finland) had issues running Trajec3D with their native language settings. This is due to a custom of using a decimal comma instead of a decimal point in numbers (10,00 vs 10.00). I changed Trajec3D Version 1.7.1.0 to be language and region insensitive, which should sort out the issue - please let me know if it does not.

The language setting error seems to only affect Trajec3D, and not GEM4D or PhotoCoreLog. I think the physics library used in Trajec3D was compiled for a specific language and region and causes this issue.
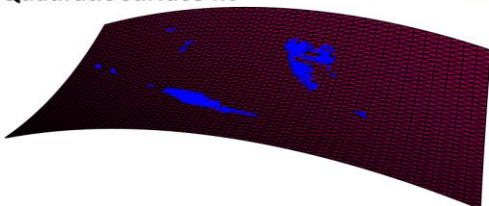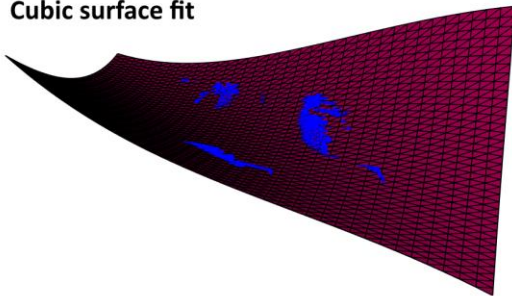

Data points

Planar surface fit
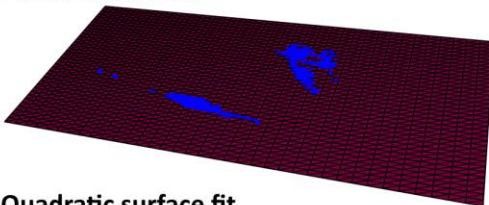
Quadratic surface fit

Cubic surface fit

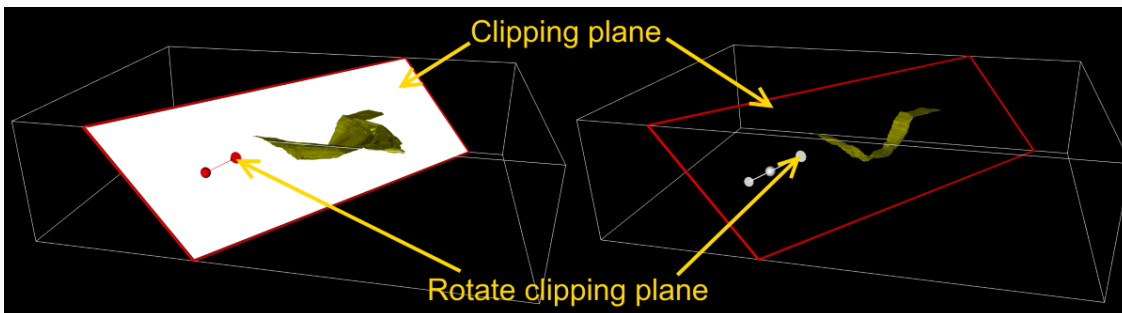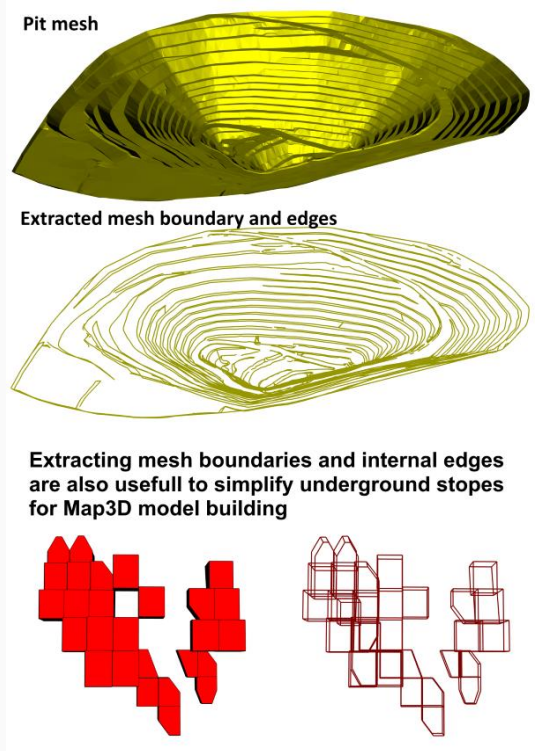## Create mathematical surfaces through data points

Creating mathematical surfaces through data points do not require input parameters, as all fitting calculations are done internally. Load the data as Markers with "*Ribbon => Marker => Add => Text (CSV)*". Now select the appropriate mathematical formula from the drop-down list in "*Ribbon => Marker => Actions => Surface*", and a mathematical surface is created using a least squares fit.

Play with different surfaces until you get the surface that makes most sense for your circumstance, and save the surface as a DXF-file with "*Ribbon => Marker => Actions => Surface => Save surface (DXF)*". Many improvements to this functionality is envisioned for future versions.

Extract mesh boundaries and internal edges

Extract mesh boundaries and internal edges with "*Top toolbar => Blue colour toolbox icon => Extract mesh boundary and edges*". The mesh boundary and internal edges are extracted as two separate objects.

The boundary edge can then be extruded with "*Top toolbar => Blue colour toolbox icon => Extrude lines or mesh surface*". This extruded surface can be used as a cookie cutter for other meshes with "*Top toolbar => Crossed swords icon => Split meshes on picked mesh*". Pick the extruded mesh with the left mouse button, which then Boolean cuts all visible meshes.

Pit mesh

Extracted mesh boundary and edges

Extracting mesh boundaries and internal edges are also usefull to simplify underground stopes for Map3D model building

Clipping widget

Activate the clipping plane widget with "*Complex actions => Clipping => Show plane*" at the bottom of the interface to the right. The clipping plane widget can be moved with the mouse by grabbing the white bounding edge, clipping plane, or red plane edge. Each movement option has a slightly different behaviour and easy to figure out by playing with the widget. Grab the tail of the arrow and rotate the widget to any orientation for a custom clipping orientation.
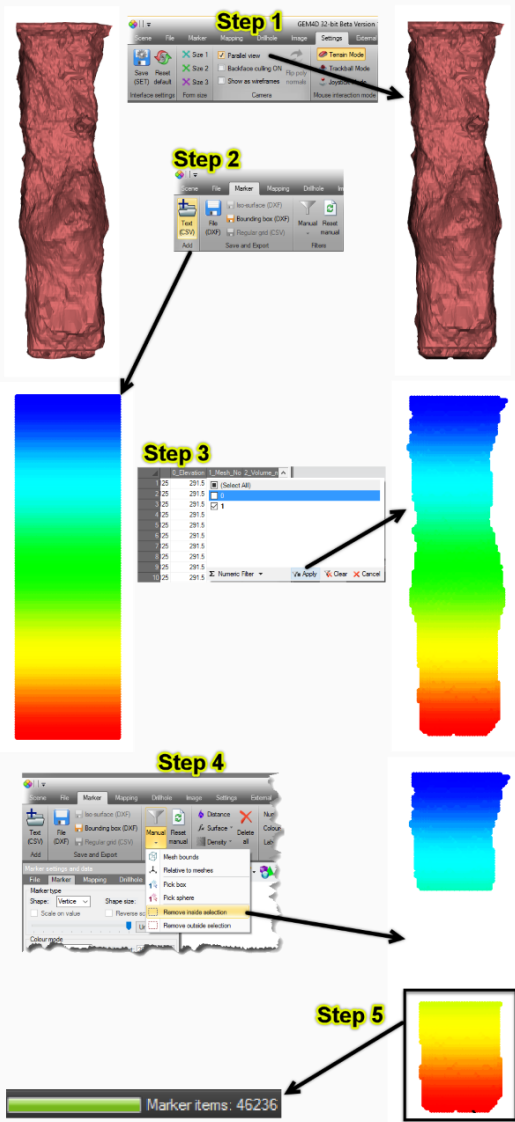
Volume of single mesh

"***Top toolbar => Yellow toolbox icon => Volume from a single closed mesh***" automatically calculates and reports divergence theorem and block volume estimations. The block model estimation creates a grid of points where each point represents a known volume, and classified as outside or inside the mesh. When the calculation is completed, two file names are requested:

1. DXF-file name that save a file with the points inside the mesh only. The layer name of the object also captures the volume estimated with the block volume model.
2. CSV-file that captures all the points of the original grid, and the classification for each point in the "***Mesh_No***" column.

The CSV-file can be loaded as Markers, which allows for the deletion, addition and filtering of points in the grid and spatially in the scene. As the volume is just the number of points multiplied by the volume of each point, volumes can be customized to specific requirements, such as calculating sub-volumes etc. - see my blog for details.

Stope reconciliation

"***Top toolbar => Yellow toolbox icon => Volume from two closed meshes***"
enables the quick calculation of over- and under-break of stopes. Similar to the "***Volume of single mesh***" discussion above, when used in combination with the Marker scene filtering tools, volumes for individual walls can be easily extracted. In this case, the points are classifying relative to the input meshes:

1. Outside all meshes (*not shown in image to the right).*
2. Inside both meshes (*red).*
3. Inside design shape only (*blue).*
4. Inside actual CMS only (*green).*

From the last three values, the volumes of both meshes are known, as well as the over-break and under-break - see my[blog](blog) for details.