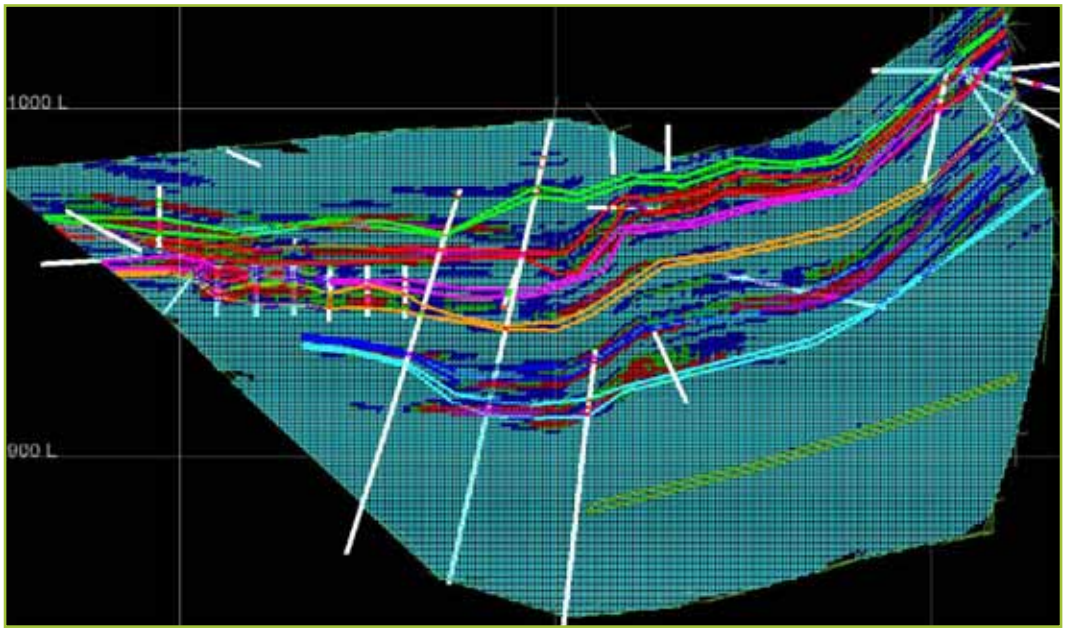
MAPTEK™ Vulcan™

Tetramodels at Plutonic

At Barrick Plutonic Gold Mine, approximately 800km northeast of Perth in Western Australia, mineralisation regularly occurs as shallowly to steeply dipping, parallel lodes. Identifying regions for economic mining is critical.



Cross-section showing drillholes and lode wireframes superimposed over a tetra model

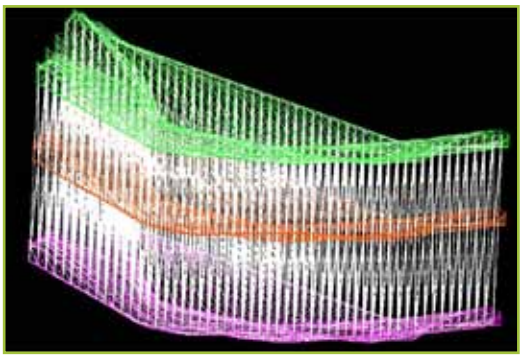
IN AREAS WITH MULTIPLE SUB-PARALLEL LODES, TETRAMODELLING CAN BE USED TO QUICKLY IDENTIFY AREAS OF ECONOMIC IMPORTANCE.

Some mineralised zones or resource areas contain hundreds of multiple sub-parallel lodes. Traditional models generally require a wireframe for each lode, with most of the domains having more than 100 modelled lodes. For one model the wireframing process took 8 months.

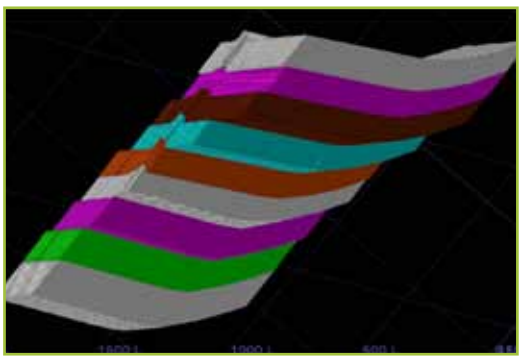
The tetramodelling functionality in Maptek Vulcan is designed for unfolding and grade estimation of deformed stratabound deposits. It can be applied to any deposit where mineralisation is controlled by stratigraphic or structural surfaces that can be modelled.

Using a distorted search ellipse that follows a modelled surface allows the block model and all the samples used for estimation to stay in their true position. Without unfolding or changing the original position of the blocks and the estimation samples, Vulcan can generate an accurate grade estimate.

Tetramodelling was successfully tested on several resource areas of the Plutonic Gold Mine containing multiple sub-parallel lodes. The results were close to traditional modelling for most of these areas.



3D view of a grid tetrahedron model



3D view of a tetra grid model

Tetramodels were created using a single surface modelled through the middle of the most continuous lode of each resource area. Later this surface was copied to the hanging-wall and footwall levels of the mineralised zone.

By avoiding complex unfolding and refolding, tetramodelling reduces the chances of translational errors.

All estimation parameters were generally similar to those used for traditional estimations except the search size and orientation involve a rolling search. The bearing was always kept close to the strike of the orebody, and with a rolling search the dip and plunge values were always set to zero. The hanging-wall and footwall surfaces covered the same area without any overhangs.

Two types of tetramodels were used. A projection model was used only for vertical projection between sub-horizontal hanging-wall and footwall surfaces.

A grid model was projected in different directions ranging from sub-vertical to horizontal, with a 10m x 10m grid over the triangulated hanging-wall and footwall surfaces. This creates a triangulation composed of tetrahedrons running between the top and bottom surfaces.

Instead of the months required by traditional methods for creating wireframes for each lode of the mineralised zone, creation of a single surface used for the tetramodel took less than a week. Since tetramodelling produced efficient estimates at Plutonic, this technique was adopted for all resource areas containing multiple sub-parallel lodes.

Tetramodelling is efficient as it requires only one or two modelled surfaces compared to hundreds of wireframes. In areas with multiple sub-parallel lodes, it can be used to quickly identify areas of economic importance.

Thanks to Aslam Awan
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