

Technical Support Tips

Ellipsoidal Searches in MEDSYSTEM®

(Used in M620V1, M620V2, M621V1, M624IK, M624V1)

Differences in the structural character of the mineralization of an ore deposit along various directions are described by anisotropy. Variograms along different directions can determine the existence of anisotropy.

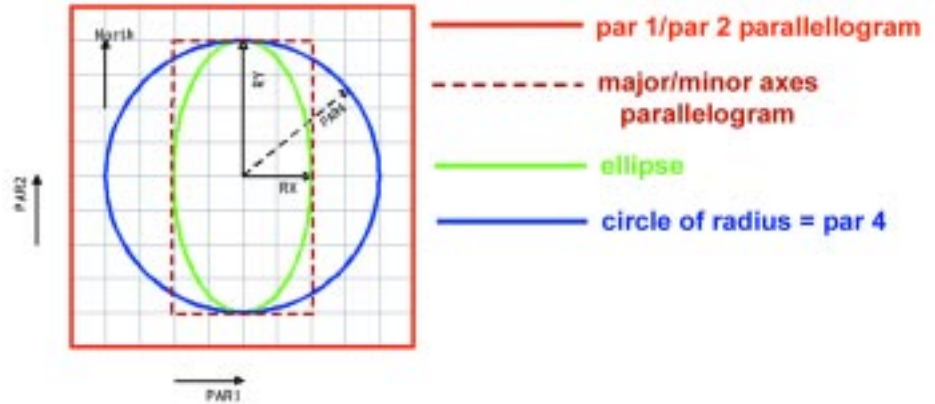
If anisotropy exists, an ellipse should be used to define a search neighborhood. The ellipse is centered on the point or the center of the block being estimated. The ellipse should be oriented with its major axis parallel to the direction of maximum continuity.

Once you have determined the orientation of the anisotropy axes and the length of those axes, you should:

1. Assign PAR1, PAR2 and PAR3 (x, y and z search distances respectively) so the ellipse is included inside the parallelepiped formed by PAR1, PAR2 and PAR3.
2. Assign PAR4 (**max allowed search distance**) equal to the length of the **major axis**.
3. Include the ellipse search using the lengths and orientation of axes.

A search will be performed in the following fashion:

1. Composites inside the box formed by PAR1, PAR2 and PAR3 are preselected.
2. Selection is further limited inside the parallelepiped formed by the major, minor and vertical ellipse axes.
3. The points inside the ellipse:
 $x^2 * (RY/RX)^2 + y^2 + z^2 * (RY/RZ)^2 \leq PAR4^2$
 are finally kept.



IOP6 (zero for real or one for adjusted) will determine if adjusted or real distances will be used and/or reported after the initial ellipsoidal search.

In the kriging algorithm (M624IK, M624V1), ellipsoidal search and IOP6 apply only to the selection of the composites, and not to the distances used in variography. Kriging weights are calculated from the variogram parameters.

In the IDW algorithm (M620V1, M620V2, M621V1), IOP6 will make a difference in the calculation of weights (weights are based either on true or adjusted distances).

The following example shows how the adjusted distances are calculated (a 2-D search is assumed for simplicity):

Let us assume that two samples exist:

- comp1 along the minor axis of an ellipse (40m from the block) and

comp2 inside the parallelogram defined by major and minor axes but outside the ellipse (50m from x and y axes; 70.7m direct distance from the block).

- a search of 100m (major), 50m (minor), 0m (vertical) with no rotation is used.

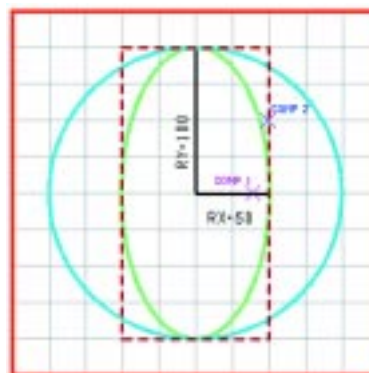
The adjusted distance for comp1 would be:

$$(100/50)^2 * 40^2 = a^2 \Rightarrow a = 80\text{m}$$

The adjusted distance for comp2 would be:

$$(100/50)^2 * 50^2 + (100/100)^2 * 50^2 = b^2 \Rightarrow b = 111.8\text{m}$$

If PAR4 equals 100 (=RY), comp1 will be included in calculations, whereas comp2 will not. If PAR4 were smaller than 80, comp1 would not have been considered either. If PAR4 were greater than 111.8, comp2 would also have been used.



Comp 1
 Real Distance = 40
 Adjusted Distance = 80

Comp 2
 Real Distance = 70.7
 Adjusted Distance = 111.8