

## عنوان مقاله:

Ant colony algorithm as a high-performance method in resource estimation using LVA field; A case study: Choghart Iron ore deposit

## محل انتشار:

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## خلاصه مقاله:

Kriging is an advanced geostatistical procedure that generates an estimated surface or 3D model from a scattered set of points. This method can be used for estimating resources using a grid of sampled boreholes. However, conventional ordinary kriging (OK) is unable to take locally varying anisotropy (LVA) into account. A numerical approach has been presented that generates an LVA field by calculating the anisotropy parameters (direction and magnitude) in each cell of the estimation grid. After converting the shortest anisotropic distances to Euclidean distances in the grid, they can be used in variography and kriging equations (LVAOK). The ant colony optimization (ACO) algorithm is a nature-inspired metaheuristic method that is applied to extract image features. A program has been developed based on the application of ACO algorithm, in which the ants choose their paths based on the LVA parameters and act as a moving average window on a primary interpolated grid. If the initial parameters of the ACO algorithm are properly set, the ants would be able to simulate the mineralization paths along continuities. In this research work, Choghart iron ore deposit with 2,447 composite borehole samples was studied with LVA-kriging and ACO algorithm. The outputs were cross-validated with the 111,131 blast hole samples and the Jenson-Shannon (JS) criterion. The obtained results show that the ACO algorithm outperforms both LVAOK and OK (with a correlation coefficient value of 0.65 and a JS value of 0.025). Setting the parameters by trial-and-error is the main problem of the .ACO algorithm

## کلمات کلیدی:

Ant Colony algorithm, Locally Varying Anisotropy, Resource Estimation, Kriging, Choghart Deposit

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