عنوان مقاله:

Application of truncated gaussian simulation to ore-waste boundary modeling of Golgohar iron deposit

محل انتشار:

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خلاصه مقاله:

Truncated Gaussian Simulation (TGS) is a well-known method to generate realizations of the ore domains located in a spatial sequence. In geostatistical framework geological domains are normally utilized for stationary assumption. The ability to measure the uncertainty in the exact locations of the boundaries among different geological units is a common challenge for practitioners. As a simple and informative example of such a boundary, one can consider the boundary between ore and waste materials in an ore deposit. This boundary addresses the percentages of the ore and the waste, and also affect the future economy of mine and all precedent mine designs and mine plans. Deterministic approaches, based on interpretation of geological phenomenon, provide just one scenario of ore-waste variation, and do not offer a model for uncertainty of boundaries. On the other hand, geostatistical simulations, based on stochastic models, can measure the uncertainty of such a boundary. Through different techniques for spatial simulation of the categorical data (geological domains) truncated gaussian simulation has been proved to be versatile when geological units have sequential geometries and/or there are few number of indicators (ore and waste). This study addresses the application of TGS for conditional simulation of ore and waste domains in Golgohar iron ore deposit. Separation of the ore and waste domains has affected the ore tonnage estimation and resource evaluation. Various simulations can be considered as the spatial realizations of ore and waste. TGS can generate realizations of the domains and measure the uncertainty of ore-waste boundary. The accuracy of result has been checked through performance evaluation section and different scenarios (e.g. best, average and worst). The best scenario is the one with the most accuracy that is calculated from confusion matrix. The scenario No. 44 with 96 million cubic meters tonnage has an accuracy over 86 percent that is proposed as the best scenario for future mine design and planning.

کلمات کلیدی:

Truncated Gaussian Simulation, Geological boundaries, Uncertainty modeling, Iron ore

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