Implicit Orebody Modelling with Support Vector Machines

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Résumé

Solid modelling in mineral resource estimation is an important phase since block model is built with respected to the orebody. If the solid model of the ore deposit is not consistent with approximate real case, error will accumulate progressively through the estimation steps. Interpretation in classical approach, where sections are taken through drill-holes and polygonized with geological and mining knowledge is very critical and the process is always time consuming. In this study, support vector machine (SVM) algorithm is offered as a solution for 3D solid modelling, based on the raw data from drillholes. The proposed implicit method is based on Gaussian radial basis functions and it is applied to an epithermal gold deposit in Turkey in order to build 3D solid model of the mineralization. The input variables are converted to indicator values which are ore-zone and no-ore-zone. Mineralized zones in each section is classified with SVM based on indicator variables of drill-holes falling in corresponding sections and finally these sections are combined in order to create 3D solid model. The SVM is fast when compared to the classical slice sectioning and 3D solid model reveals consistent result. In proposed approach, with the successful realization of the orebody models which are in a homogeneous geological domain is produced. Models reflecting correct and realistic characteristics of geological and grade continuity will directly contribute to the proper management of the mine planning process. Furthermore, evaluation of both geological and grade continuity at the same time with this approach is also discussed.

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