

NOVEL INDICATOR KRIGING IMPLEMENTATION STRATEGIES AND TIPS FOR GEOLOGICAL RESOURCE MODELLING

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Indicator kriging (IK) has almost become an industry standard for resource modeling in geostatistics. In the traditional geostatistical methods, IK is employed to deal with outliers, model multiple mineralisation and handle categorical data. In geostatistical simulation, IK is used to derive the conditional cumulative distribution function (ccdf) from which one may draw a series of simulated grades. Practitioners are finding new ways of exploring IK as they move from a conventional IK approach to indicator simulations and devising novel IK methodologies to handle practical implementation problems. Some of the implementation issues are: (1) class indicators being linearly related leading to linear dependence in the row and column of the experimental matrix of the indicator covariance functions, (2) risk of numerical instabilities in the covariance matrix, (3) order relation deviation and correction procedures, (4) threshold selection criteria, (5) search strategies, (6) interpolating ccdfs within each class of thresholds, (7) extrapolating ccdfs beyond the smallest and the largest cut-off grade, and (8) analyses of the upper and lower class statistics. Based on a case study from a highly skewed gold deposit in the Queensland Province of Australia, a novel methodologies and strategies have been surveyed and developed to deal with some of the IK implementation problems. The paper also highlights the most innovative implementation tips and tricks that can be used to make IK work properly, save computing time and ensure accuracy, whether used in stochastic simulation or employed in traditional kriging.