

## Abstract

*One very important step in mining is exploration. This thesis uses computing to help exploration to estimate the grade value at the unknown location. The purpose of this thesis is to estimate the interval of lower limit and upper limit of gold and silver grade by using bootstrap algorithm and simulate the distribution of value estimation at unknown location. Simple Kriging is used to calculate the estimation and Bootstrap algorithm is used to calculate the interval of estimation.*

*Simple Kriging uses covariogram to calculate the correlation of spatial data. Cross validation is used to find the best model of covariogram to be used in simple kriging equations. Values of valid covariogram model are transformed into independent data by Cholesky Decomposition method, and bootstrap algorithm will summon the data randomly. The summoned data will be transformed back into its original shape and it is processed by simple kriging to find estimated values at the unknown point. From summoning data until search the estimation by simple kriging is repeated B times with 95% of confidence value, the repetitions are purposed to get the interval of the estimate values. This thesis estimated the distribution of the estimated value, for the lower limit is 4.03040 to 4.09727 gr / ton of gold grade and 190.042 to 190.103 gr / ton of silver grade, the distribution of the upper limit is 4.22531 to 4, 27059 gr / ton of gold grade and 190.219 to 190.262 for data gr / ton of silver grade.*

**Keywords:** *spatial data, covariogram, cross validation, simple kriging, cholesky decompositon, bootstrap algorithm*