

Discrete Element Simulation Based Investigation Into Statistical Inference Problems for SAG Mill Operations

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Abstract

As statistical inference tools have matured over the last five decades, scientists and engineers have been embracing a statistical approach towards problem solving, rather than the conventional deterministic approach. In particular, inference and characterisation problems in engineering have matured considerably in this regard with the regular availability of Kriging, Inverse Regression and Artificial Neural Networks (ANNs) to name a few strategies [2]. Instead of resolving a single value for a variable, the underlying probability function for a variable is estimated. In this study, we consider statistical inference problems for the comminution application of SAG mill operations when only sparsely sampled data is available.

Comminution is a large consumer of total energy of planet earth, estimated up to 10 percent. Proper inference models may assist in improving mining operations that may lead to significant energy savings. In turn, discrete element simulations remain costly even with the utilisation of general purpose graphical processing units (GPGPUs) [1]. Consequently, data can only be sparsely sampled. This study explores potential statistical inference problems in SAG mill operations when limited time series operation data is available.

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References

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