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A Multi-scale Computation Modelling Study on Grinding Classification Process

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In mineral processing, the particle size reduction process using mills is a highly energy intensive process. Due to the complex of slurry flow in mills, there are no design rules or correlations that can be used to quantitatively predict the performance of a specific mill process. Computational fluid dynamics (CFD) modelling, due to large increases in computing performance, improved software and multiphase algorithms, allow prediction of complex flows such as those encountered in grinding process, which previously could not have been achieved.

This paper aims to apply a multi-scale modelling method to study the complex motion of slurry in mills. The discrete particle method (DPM) will be used to laboratory mills. Following model validation, the information from the DPM model will be used to improve the constitutive correlations of a process scale modelling, e.g. the two fluid modelling (TFM). The TFM will be then used for an industrial scale mill simulation and provide useful information to support industrial scale mill design/controls.