

FROTH FLOTATION WITH DRAINAGE: NUMERICAL METHOD AND SIMULATIONS.

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ABSTRACT. Froth flotation is a common unit operation used in mineral processing [2, 5]. It serves to separate valuable mineral particles from worthless gangue particles in finely ground ores. The drainage of liquid due to capillarity is essential for the formation of a stable froth layer [3, 4]. A monotone numerical scheme is derived and employed to simulate the dynamic behaviour of a flotation column [1], under variable operating conditions such as control actions that drive the process to desired states of operation. It is also proven that, under a suitable Courant-Friedrichs-Lewy (CFL) condition, the approximate volume fractions are bounded between zero and one when the initial data are. Dynamic simulations are obtained with the numerical method.

Keywords: froth flotation; sedimentation; drainage; capillarity; three-phase flow; conservation law; numerical simulations.

Mathematics Subject Classifications (2010): 35L65, 35R05, 76T10

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