FROTH FLOTATION WITH DRAINAGE: MODEL AND STEADY-STATE SOLUTIONS ANALYSIS.

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Abstract. Froth flotation is a common unit operation used in mineral processing to separate valuable mineral particles from worthless gangue particles in finely ground ores. In it, the valuable mineral particles attach to bubbles of air that rise to the top of the column where they are removed, while the gangue particles settle to the bottom of the tank. For the efficiency of the process, it is important that a layer of froth develops near the top of the column. This froth layer works as a filter enhancing the separation process but also reduces the amount of water present in the effluent. In this talk, we will focus on the model for froth flotation introduced in [1], that includes the drainage of liquid occurring at the top of the column, where a froth layer rich in valuable minerals is created. We will detail the construction of steady-state solutions and provide algebraic equations and inequalities that establish the dependence of steady states on the input and control variables.

Keywords: froth flotation; sedimentation; drainage; capillarity; three-phase flow; conservation law; second-order degenerate parabolic PDE; steady states.

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

References

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