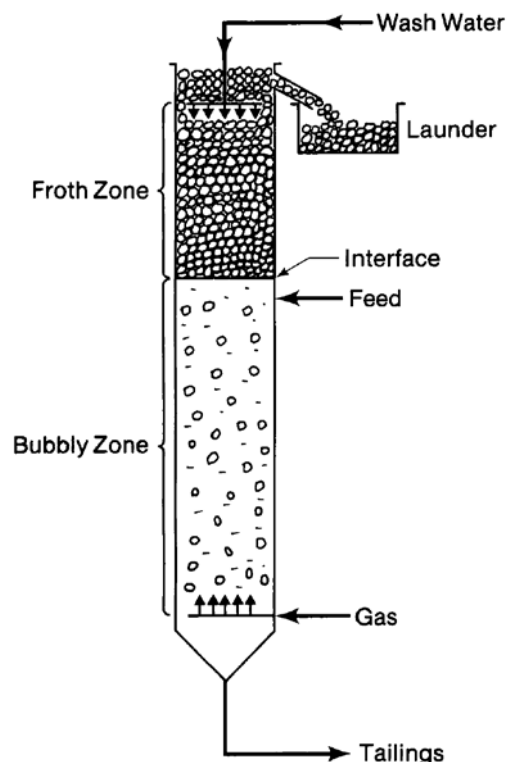


Suggested Master of Science project for 1-2 students at the division of Mathematics LTH and Numerical Analysis:

## Modelling and simulation of flotation

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Froth flotation is a process commonly used in mineral processing to separate valuable minerals from a suspension of crushed ore in a liquid, usually water. In wastewater treatment, the process is used for the removal of oil and fat. A suspension is fed into a flotation column (see the figure), into which gas bubbles are injected and there is an effluent of bubbles at the top and liquid at the bottom. The particles that should be removed are (made) hydrophobic, which means that they attach to the bubbles and rise. At the top of the column, wash water is applied so that the hydrophilic particles remain in the liquid. The volume fraction of bubbles in different parts of the column depends on the injected volumetric flows of gas, feed suspension and wash water. The volume fraction of bubbles as a function of height and time can be modelled with a nonlinear partial differential equation, which solution may contain discontinuities (shock wave). The project means some theoretical study about this type of equation and thereby the understanding of the numerical method used for simulation. Such a method should be implemented for the simulation of the process. The goal is to reproduce some of the experiments that are reported in the mineral and chemical engineering literature. Perhaps some extension of the existing models can be made.



(Pal and Masliya, Canadian J. Chem. Eng. 67, 1989)