

# A Compressible Model for Separated Two-Phase Flows Computation

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In order to simulate numerically the physical behaviour of a free surface between two fluids, we have developed a compressible model, able to correctly reproduce sloshing with or without capillary forces. We will first present the model. It is composed of four equations in two space dimensions : two for each fluid mass conservation, and two for momentum conservation. The gas and liquid phases are supposed to be compressible fluids following an isothermal linearized equation of state. A mechanical equilibrium relation closes the model (*the equilibrium model*). Relaxing this relation, we obtain a new model (*the relaxation model*) that is more adapted for numerical treatment, following the ideas in [1, 2]. The surface tension effects are taking into account in a CSF way, [3]. The second part of our contribution is dedicated to the presentation of the numerical method that we used. We explain why it does not need a scheme for the volume fraction. In particular, there is no specific algorithm to localize the interface, as in VOF, Level-Set or Front Tracking methods. The last part is devoted to some validation results, compared to analytical solution or experimental data.

## References

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