OSAMOAL
Optimized simulations by adapted models using asymptotic limits

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The purpose of this project is to develop an adaptive numerical method for systems of balance laws with relaxation. The keypoint is to dynamically replace the original system by a simpler one in some localized regions of the computational domain, in order to reduce the complexity of the resolution while maintaining the global accuracy. In our context, the simpler model is obtained by the so-called late-time asymptotic limit and is a parabolic set of PDE.

The study may be split in the following parts:
− develop interface coupling methods between the original model and the coarse model,
− find local error indicators to estimate the solution of the original model and the solution of the simpler model,
− develop a strategy of dynamical adaptation based on the two latter steps.

In a first stage, this analysis and the resulting algorithm are planned to be applied on the case of the wave equation with damping. More complex models will be considered if preliminary results are promising.

Some references on the subject:

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