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Uniform asymptotic preserving scheme for hyperbolic systems in 2D

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In this work, we are interested by the discretization of hyperbolic system with stiff source term. Firstly we consider a simple linear case : the damped wave equation which can be approximative by a diffusion equation at the limit. For this equation we propose a asymptotic preserving scheme which converge uniformly on general and unstructured 2D meshes contrary to the classical extension of the AP which are not consistent in the limit regime on unstructured meshes. After that we propose to extend this method to a nonlinear problem: the Euler equations with friction. At the end the link with the well-balanced scheme (for Euler-Poisson) will be introduced.

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