Approximation of the bi-temperature Euler system in 2 space dimensions

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This talk is devoted to the numerical approximation of the bi-dimensional bitemperature Euler system. This model is a non-conservative hyperbolic system describing an out of equilibrium plasma in a quasi-neutral regime. This system is a non-conservative hyperbolic system, because it contains products of the velocity with a pressure gradient. This can not be transformed into a divergence.

We develop a second order numerical scheme by using a discrete BGK relaxation model. The second order extension is based on a subivision of each cartesian cell into four triangles to perform affine reconstructions of the solution. Such ideas have been developped before in the literature for systems of conservation laws. We show how they can be used in our non-conservative setting. The numerical method is implemented and we shall present numerical tests.

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