

$L^2$ -DISSIPATIVITY OF EXPLICIT REGULARIZED AND LINEARIZED  
FINITE-DIFFERENCE SCHEMES ON A NON-UNIFORM SPATIAL MESH  
FOR THE 1D GAS DYNAMICS EQUATIONS

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**Abstract:** We study explicit finite-difference schemes with a regularization, linearized at the constant solution, for the 1D gas dynamics equations. For the Cauchy problem and a non-uniform spatial mesh, the sufficient condition on the Courant number for the  $L^2$ -dissipativity of the schemes is derived. The energy-type technique is developed to this end, and the proof is both short and under simple conditions on matrices of the convective and regularizing terms. A scheme with a kinetically motivated regularization is considered as an application in more detail.

## References

- [1] A. Zlotnik, On  $L^2$ -dissipativity of linearized explicit finite-difference schemes with a regularization on a non-uniform spatial mesh for the 1D gas dynamics equations, *Applied Mathematics Letters* **92** (2019) 115-120.