

# High order semi-implicit methods for gas flow

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## Abstract

In gas flows the high speed of pressure waves is a challenging task for numerical methods. In this talk we develop high order numerical schemes which are able to accurately resolve the actual flow with moderate numerical costs. The method is based on a modification of the splitting approach proposed by Degond and Tang [2], where the fast pressure waves are considered separately from the slow moving waves. This representation is combined with the framework of semi-implicit schemes of Boscarino, Filbet and Russo [1]. In numerical experiments we analyze the scheme and extensions to gas networks are discussed.

## References

- [1] Sebastiano Boscarino, Francis Filbet, and Giovanni Russo. High Order Semi-implicit Schemes for Time Dependent Partial Differential Equations. *J. Sci. Comput.*, 68(3):975–1001, 2016.
- [2] Pierre Degond and Min Tang. All speed scheme for the low Mach number limit of the isentropic Euler equations. *Commun. Comput. Phys.*, 10(1):1–31, 2011.