
ICRAMCS 2026

THE EIGHTH EDITION OF THE INTERNATIONAL CONFERENCE ON
RESEARCH IN APPLIED MATHEMATICS AND COMPUTER SCIENCE

April 23-24-25, 2026 | Marrakech, Morocco



Non-oscillatory central schemes for nonlocal conservation laws with space-discontinuous flux

Communication Info

Authors:

Said BELKADI¹

Mohamed ATOUNTI²

¹ High School of Technology,
Nador, Morocco.

² High School of Technology,
Nador, Morocco.

Keywords:

(1) Finite volume methods

(2) Nonlocal conservation laws

(3) Traffic flow models

Abstract

We develop non-oscillatory central schemes for a traffic flow model with spatially discontinuous flux, originally proposed in [1]. Specifically, the proposed schemes extend the first-order staggered Lax–Friedrichs scheme and belong to the class of Godunov-type projection–evolution methods. While most Godunov-type schemes rely on upwinding and thus require the solution of (generalized) Riemann problems, central schemes are free of Riemann solvers. This feature makes them particularly attractive for the traffic flow model under consideration. To assess performance, a series of numerical experiments is conducted and compared with existing first-order methods, demonstrating the efficiency and accuracy of the proposed schemes. Furthermore, the limit model obtained as the kernel support tends to zero is also investigated numerically.

© ICRAMCS 2026 Proceedings ISSN: 2605-7700

References

[1] Chiarello, F. A., and Villada, L. M., On existence of entropy solutions for 1D nonlocal conservation laws with space-discontinuous flux, arXiv preprint arXiv:2103.13362, (2021), 1-20.

[2] S. Belkadi, M. Atounti, Central finite volume schemes for nonlocal traffic flow models with Arrhenius-type look-ahead rules, Math. Model. Comput., 10, No 4 (2023), 1100-1108.

[3] S. Belkadi, M. Atounti Non-oscillatory central schemes for general nonlocal traffic flow models, Int. J. Appl. Mat, Volume, 35(4) (2022), 515-528.