Title: A nonlocal macroscopic model of multi-population pedestrian flows with anisotropic kernel.

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Abstract: We focus on the numerical approximation of a nonlocal macroscopic pedestrian flow model accounting for anisotropic interactions between different groups and including the presence of walls or other obstacles in the domain. We propose to use Finite Difference WENO (FD-WENO) schemes to obtain high-order approximations, with quadratic polynomials reconstructions in each grid point to evaluate the nonlocal term. The behavior of the solution in the presence of obstacles and how they influence its evacuation time is studied. In particular, the optimal position of the obstacles is obtained using total travel time optimization processes.

References:

2015 A. Aggarwal, R. M. Colombo, and P. Goatin. Nonlocal systems of conservation laws in several space dimensions. SIAM *J. Numer. Anal.*, 53(2):963–983.

2020 R. Bürger, P. Goatin, D. Inzunza, and L. M. Villada. A non-local pedestrian flow model accounting for anisotropic interactions and domain boundaries. *Math. Biosci. Eng.*, 17(5):5883-5906

2012 R. M. Colombo, M. Garavello, and M. Lécureux-Mercier. A class of nonlocal models for pedestrian traffic. *Math. Models Methods Appl. Sci.*, 22(4):1150023, 34.

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2009 C. W. Shu. High order weighted essentially nonoscillatory schemes for convection dominated problems. SIAM *Review*, 51(1):82–126.

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