NUMERICAL METHODS FOR A NONLOCAL CONSERVATION LAW

AFAF BOUHARGUANE AND REMI CARLES

Abstract. We consider a nonlocal scalar conservation law proposed by Andrew C. Fowler to describe the dynamics of dunes. This model involves a nonlocal term which can be seen as an anti-diffusive fractional differential operator. We propose a numerical procedure based on splitting methods to approximate the solutions of this equation. We prove the convergence of the well-known Lie formula and we use the split-step Fourier method to approximate the continuous problem. Numerical experiments confirm the theoretical results.

Keywords: Nonlocal operator, operator splitting, split-step Fourier method, stability, error analysis.

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References


University of Bordeaux, IMB, 33400 Talence, France.
E-mail address: Afaf.Bouharguane@math.u-bordeaux1.fr

University of Montpellier, CNRS, 34095 Montpellier, France
E-mail address: Remi.Carles@math.cnrs.fr