Bürger, R.; **Karlsen, K. H.**; **Risebro, N. H.**; **Towers, J. D.**

Well-posedness in BV_t and convergence of a difference scheme for continuous sedimentation in ideal clarifier-thickener units. (English) Zbl 1053.76047

Numer. Math. 97, No. 1, 25-65 (2004).

Summary: We consider a scalar conservation law modeling the settling of particles in an ideal clarifier-thickener unit. The conservation law has a nonconvex flux which is spatially dependent on two discontinuous parameters. We suggest to use a Kruzhkov-type notion of entropy solution for this conservation law and prove uniqueness (L^1 stability) of the entropy solution in the BV_t class (functions $W(x,t)$ with $\partial_t W$ being a finite measure). The existence of a BV_t entropy solution is established by proving convergence of a simple upwind finite difference scheme (of Engquist-Osher type). A few numerical examples are also presented.

MSC:

76M20	Finite difference methods applied to problems in fluid mechanics
76T20	Suspensions
65M12	Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs
65M06	Finite difference methods for initial value and initial-boundary value problems involving PDEs
35L65	Hyperbolic conservation laws
35R05	PDEs with low regular coefficients and/or low regular data

Keywords:

Kružkov entropy solution; scalar conservation law; uniqueness

Full Text: DOI