

Guerra, Graziano; Shen, Wen**Existence and stability of traveling waves for an integro-differential equation for slow erosion.** (English) [Zbl 1320.35138](#)[J. Differ. Equations 256, No. 1, 253-282 \(2014\).](#)

Summary: We study an integro-differential equation that describes the slow erosion of granular flow. The equation is a first order nonlinear conservation law where the flux function includes an integral term. We show that there exist unique traveling wave solutions that connect profiles with equilibrium slope at $\pm\infty$. Such traveling waves take very different forms from those in standard conservation laws. Furthermore, we prove that the traveling wave profiles are locally stable, i.e., solutions with monotone initial data approach the traveling waves asymptotically as $t \rightarrow +\infty$.

MSC:

- [35C07](#) Traveling wave solutions
- [35R09](#) Integro-partial differential equations
- [35L65](#) Hyperbolic conservation laws
- [35B35](#) Stability in context of PDEs
- [35L45](#) Initial value problems for first-order hyperbolic systems

[Cited in 8 Documents](#)**Keywords:**[erosion of granular flow](#); [monotone initial data](#)**Full Text:** [DOI](#) [arXiv](#)