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An extension of the Savage-Hutter gravity driven granular flow model on arbitrary topography in 1D

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In an implementation of the Savage-Hutter model in a GIS (geographic information system, e.g. GRASS GIS) curvature terms must be accounted for. We extend the work of Bouchut et al. (2003) to include friction between flowing mass and bed, as well as the active/passive earth pressure coefficient to model the behavior of the granular flow according to the original Savage-Hutter idea. Conservation of mass and momentum in curvilinear coordinates are integrated over the flow height yielding a shallow water model. This work is part of the project avaflow: http://www.avaflow.org/

References:
F. Bouchut, A. Mangeney-Castelnau, B. Perthame, J.-P. Vilotte, A new model of Saint Venant and Savage-Hutter type for gravity driven shallow water flows, C.R. Acad. Sci. Paris, série I 336 (2003), 531-536.