

NON-LOCAL RHEOLOGY IMPLEMENTATION FOR GRANULAR FLOW MODELING

Cesar M. Venier^{a,b}, Santiago Márquez Damian^{a,c} y Norberto M. Nigro^{a,d}

^a*Centro de Investigación de Métodos Computacionales, Universidad Nacional del Litoral/CONICET, Colectora Ruta Nac. 168 Paraje El Pozo, Santa Fe, Argentina, <https://cimec.conicet.gov.ar/>*

^b*Escuela de Ingeniería Mecánica, Facultad de Ciencias, Ingeniería y Agrimensura, Universidad Nacional de Rosario, Riobamba 250 bis, Rosario, Argentina*

^c*Facultad Regional Santa Fe, Universidad Tecnológica Nacional, Lavaisse 610, Santa Fe, Argentina*

^d*Facultad de Ingeniería y Ciencias Hídricas, Universidad Nacional del Litoral, Ruta Nacional N° 168, Santa Fe, Argentina*

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Abstract. This work presents the implementation of a granular rheology model based on the non-local granular flow (NGF) model. This is done on the structure of the Volume-Of-Fluid (VOF) model for multiphase flows. These developments are motivated by the need for a low computational cost method for modeling granular media in dense phase, which are found in multiple applications in the industrial field. In particular, there are phenomena where the shear stresses depend on the size of the particle (e.g. Couette flow, silo discharge), as well as cases where the movement (or absence thereof) of the mass of grains is not strictly bounded above or below the yield limit (e.g. clogging in silo discharge, grain flow on an inclined plane). For these cases, the continuum models of local granular rheology, usually used, are limited. The implementation of this model is tested in a series of benchmark cases and the results are contrasted with experimental observations or analytical solutions. The simulation results show a good agreement with those reported in the literature, highlighting the benefits of these models and laying the foundations for their application in cases of industrial scale.