

Computer simulation of collapsing columns of granular materials using the discrete element method.

Gabriel Nóbrega Bufolo (gbufolo7@gmail.com)

Yuri Dumaresq Sobral (y.d.sobral@mat.unb.br)

Departamento de Matemática, Universidade de Brasília

Abstract. We have implemented a computer simulation of collapsing columns of granular materials using the discrete element method. In this simulation, we consider only the normal contact and friction forces of type particle-particle and particle-wall. The normal contact forces follow the Hertzian model while the friction forces follow the Cundall-Strack model. Calling the height of a column as H and the length of the base as L , we can define the aspect ratio of the column as $a = H/L$. We have simulated columns with different aspect ratios and preliminary results suggest that the runout distance scales with a power of the aspect ratio. The simulation was implemented in C++ and the rendering uses the SFML library. It was written using TDD (Test Driven Development) and is covered by, approximately, 200 unit test written using the Google Test library.