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DEM modeling of flexible structures against granular material avalanches

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This article presents the numerical modeling of flexible structures intended to contain avalanches of granular and coarse material (e.g. rock slide, a debris slide). The numerical model is based on a discrete element method (YADE-Dem). The DEM modeling of both the flowing granular material and the flexible structure are detailed before presenting some results. The flowing material consists of a dry polydisperse granular material accounting for the non-sphericity of real materials. The flexible structure consists in a metallic net hanged on main cables, connected to the ground via anchors, on both sides of the channel, including dissipators. All these components were modeled as flexible beams or wires, with mechanical parameters defined from literature data. The simulation results are presented with the aim of investigating the variability of the structure response depending on different parameters related to the structure (inclination of the fence, with/without brakes, mesh size opening), but also to the channel (inclination). Results are then compared with existing recommendations in similar fields.