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Discrete Element Method for Granular Flow and Cracks Propagation

Granular Materials (GM) are everywhere in nature and are the second-most manipulated material in industry after water, but as once written by Pierre-Gilles de Gennes, their statistical physics is still in its infancy. In this talk, after a short overview of the mathematical challenges and the state of the art related to the diverse set of behaviors of GM, I will present some numerical simulations results, by using the contemporary Discrete Element Method (DEM) in order to simulate a wide variety of cases. I will also characterize the industrial relevance of the simulations, and the link with the cracks propagation.