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Granular materials: on topology of force chains[1] LOU KONDIC, MICHEL TSUKAHARA, NJIT, MIROSLAV KRAMAR, KONSTANTIN MISCHAIKOW, Rutgers University, JIE ZHANG, ROBERT BEHRINGER, Duke University, COREY O'HERN, Yale University — One property of granular materials is the lack of spatial scale separation between the one characterizing the particle size and the one characterizing system as a whole. This property requires careful understanding of the features which exist on particle scale, such as force chains, with the hope that this understanding will help us produce appropriate continuum level models. In this talk, we will discuss our initial attempts to characterize force chains. These attempts are based on algebraic topology techniques that will be used to analyze and quantify force chain structures. In particular, we will discuss how these properties differ for the systems exposed to shear versus compression, and correlate the topological measures to the phenomena such as jamming. Furthermore, we will discuss the possibility of using topological techniques to come up with a quantitative way of comparing experiments and simulations. Prelminary results of these comparisons will be shown.

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