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The first open channel for a yield stress fluid in complex porous media DIMITRIOS FRAGGEDAKIS, Massachusetts Institute of Technology MIT — The prediction of the first fluidized path of a yield stress fluid in complex porous media is a challenging yet an important task to understand several industrial and biological processes. In most cases, the conditions that open this first path are known either through experiments or expensive computations. Here, we present a simple network model to predict the first open channel for a yield stress fluid in a complex porous medium. For porous media made of non-overlapping spheres, we find that the pressure drop required to open the first channel depends on both the sphere relative size to the macroscopic length of the system and on the packing fraction. We also report the statistics on the arc-length of the first open path. Finally, we discuss the implication of our results on the design of porous media for enhanced transport properties.

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