

Abstract Submitted
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Redundancy: a Bridge Between Rigidity and Connectivity Percolation Models¹ VARDA F. HAGH, Arizona State University, M. F. THORPE, Arizona State University, University of Oxford — We employ the concept of redundancy in networks - stress in rigidity and loops in connectivity- to perform a one on one comparison between the two models. In the case of rigidity percolation on a generic spring network, redundant bonds are those that cause an internal stress in the system and introduce finite forces that characterize over-constrained regions. In connectivity percolation, bonds that cause a loop are redundant and all the bonds that are part of a loop are equivalent to over-constrained bonds in rigidity percolation. To illustrate this we start with a network in 2D and use numerical tools such as Pebble Game algorithm to study the behavior of over-constrained regions near rigidity transition in hierarchical networks and lattices. We then connect all the sites to a ghost site which makes every bond inside a loop become rigidly over-constrained. This allows us to use our numerical tools to look into the behavior of loops in the same networks.

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