

Abstract Submitted
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The price of anarchy is maximized at the percolation threshold

BRIAN SKINNER, Argonne National Laboratory — When many independent users try to route traffic through a network, the flow can easily become suboptimal as a consequence of congestion of the most efficient paths. The degree of this suboptimality is quantified by the so-called “price of anarchy” (POA), but so far there are no general rules for when to expect a large POA in a random network. Here I address this question by introducing a simple model of flow through a network with randomly-placed “congestible” and “incongestible” links. I show that the POA is maximized precisely when the fraction of congestible links matches the percolation threshold of the lattice. Both the POA and the total cost demonstrate critical scaling near the percolation threshold.

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