PROPERTIES OF FIRST PASSAGE PERCOLATION IN HOSTILE ENVIRONMENT

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ABSTRACT. Consider the following random competition model on a given graph G that is driven by two first-passage percolation processes FPP_1 and FPP_λ. Initially, FPP_1 occupies a single site and FPP_λ is dormant in seeds that are placed on the sites of G as a product of Bernoulli measures of parameter μ. Then, FPP_1 spreads through the edges of G at rate 1 and FPP_λ spreads from seeds at rate λ when that seed is attempted to be occupied by either FPP_1 or FPP_λ. Once a site is occupied by either process it remains occupied by that process forever. This model is known as first-passage percolation in a hostile environment (FPPHE) and was first introduced by Sidoravicius and Stauffer '19.

We establish that FPPHE is non-monotone in the sense that increasing μ or λ may increase the probability that FPP_1 occupies infinitely many sites by constructing a quasi-transitive graph where such behavior holds.

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