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Import driven large fluctuations in critical and subcritical percolation, state of the art and future perspectives

Nico Stollenwerk[1] & Maíra Aguiar[1]

[1]BCAM, Bilbao, Spain
nstollenwerk@bcamath.org

After introducing the notions of directed percolation (with a prime example in epidemiology being the SIS spatially extended stochastic system at and around the epidemiological threshold) and dynamical isotropic percolation (with the prime example being the SIR system), we show a simple renormalization scheme in the time domain to describe self-similarity at criticality and scaling near criticality.

Then we will charactrize the large fluctuations in subcritical epidemiological systems, which are driven by small import (in the limit of import vanishing), which is important in practical applications like invasion scenarios of vector-borne diseases [1], as well as prviosuly investigated during the COVID-19 pandemic after lock-down lifiting, avoiding supercitical explosion of infected but approaching the epidemiological threshold [2]. Technical aspects have been tackled since some time [3] (like Fock space representation of stochastic processes and path integrals), but now adjusted to the present scientific questions, relevant for the practical applications and data analysis.

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