

FREDRICKSON-ANDERSEN 2-SPIN FACILITATED MODEL: SHARP THRESHOLD

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ABSTRACT. The Fredrickson-Andersen 2-spin facilitated model (FA-2f) on \mathbb{Z}^d is a paradigmatic interacting particle system with kinetic constraints (KCM) featuring cooperative and glassy dynamics. For FA-2f vacancies facilitate motion: a particle can be created/killed on a site only if at least 2 of its nearest neighbors are empty. We will present sharp results for the first time, τ , at which the origin is emptied for the stationary process when the density of empty sites (q) is small. In any dimension $d \geq 2$ it holds

$$\tau \sim \exp\left(\frac{d\lambda(d, 2) + o(1)}{q^{1/(d-1)}}\right)$$

w.h.p., with $\lambda(d, 2)$ the threshold constant for the 2-neighbour bootstrap percolation on \mathbb{Z}^d .

We will explain the dominant relaxation mechanism leading to this result, give a flavour of the proof techniques, and discuss further results that can be obtained via our technique for more general KCM, including full universality results in two dimensions.

[Joint work with I.Hartarsky and F.Martinelli]

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