

Recent extinction results for stochastic porous media equations and applications to self-organized criticality

The first part of the talk will recall extinction results for stochastic partial differential equations (with multiplicative noise) of porous media type. These include stochastic fast diffusion equations and more singular cases, where e.g. the non-linearity is given by a Heaviside or sign function, so is multivalued. The latter describe certain continuum models for the phenomenon of self-organized criticality (SOC). These extinction results have been obtained in the past two years. In the SOC-case, however, extinction was only shown if the underlying spatial domain is one-dimensional and only with positive (though high) probability. The second part of the talk is devoted to very recent results, where for the SOC-case asymptotic extinction was proved for all spatial dimensions and shown to be locally exponentially fast. One main technique in the proofs is to transform the stochastic PDE into a deterministic PDE with a random parameter. The resulting deterministic PDE is of an entirely new type and new methods had to be invented for its analysis.

References

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