

A non local spatial model for savannas.

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Savannas are very important ecosystems. They appear in a wide range of climatic and ecological conditions, and are mainly characterized by a long time coexistence between a continuous grass layer and dispersal clusters of trees. Their spatial structure, resilience and adaptation capacity have awakened a great interest among ecologists¹, however, despite extensive study, the mechanisms regulating savanna tree populations are not well understood.

In this work, we propose a stochastic nonlocal macroscopic equation to model savannas which takes into account two of the factors that are thought to be crucial to structure semiarid savannas: tree-tree competition and fire².

We study the spatial structures in the mean field limit of the model, where fluctuations vanish. Later the im-

portant part of fluctuations on them is studied. We consider both intrinsic fluctuations (demographic) as a consequence of the stochastic nature of the model and extrinsic fluctuations (environmental), whose origin lies in the temporally heterogeneous distribution of precipitations.

Also, the phase transition from an active phase where grass and trees coexist, to an absorbing one, characterized by the absence of trees, is analyzed in detail in both situations³.

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¹ M. Sankaran et al., *Nature*, **438**, 846-849, (2005).

² J.M. Calabrese et al. *The Am. Nat.*, **175**, 3, (2010)

³ R. Martínez-García and C. López, (In preparation).