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STIT tessellation processes – ergodic properties in space and Markov properties in time

We consider random processes where the states are tessellations of the plane or a higher-dimensional Euclidean space. The transition to a new state is caused by a random division of individual cells, where each cell has a random life time, and at the end of its life it is randomly divided. There are several models for such processes. Among these models, the STIT tessellation (stochastically STable under the operation of ITeration of tessellations) appears to be the most promising one from a theoretical point of view, and also a potential reference model for applications. In contrast to alternative models for fracture (or fissure or crack) systems which occur inside a material or on a coating of a surface (craquelée effect), STIT allows for theoretical investigations (and not only simulation studies) which reveal essential properties and relations for its parameters.

In the talk, a survey of important features is given, including recent results on ergodic properties (joint work with S. Martínez) and a Slivnyak-type theorem (joint work with Nguyen/Thäle/Weiß).