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The Poisson Rain Tessellation Under Spatial Expansion and Temporal Transformation

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For cell-division processes in a window, Cowan introduced four selection rules and two division rules each of which stands for one cell-division model. One of these is the area-weighted in-cell model. In this model, each cell is selected for division with a probability that corresponds to the ratio between its area and the area of the whole window. This selected cell is then divided by throwing a (uniformly distributed) point into the cell and drawing a line segment through the point under a random angle with the segment ending at the cell's boundary. For the STIT model which uses both a different selection and a different division rule, Mart\'inez and Nagel showed that for a STIT process {Y(t, W): t > 0} the process {exp(t) Y(exp(t), W): t real} is not only spatially stationary but also temporally. For a continuous-time area-weighted in-cell model it is shown by using the different and generalizing approach of a Poisson Rain that in order to get temporal stationarity it is necessary to have an exponential spatial expansion. For the temporal transformation it is found that there is a strong relation between that transformation and the intensity of the Poisson Rain in time.

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