An oriented competition model on Z_+^2

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Abstract

We consider a two-type oriented competition model on the first quadrant of the two-dimensional integer lattice. Each vertex of the space may contain only one particle of either Red type or Blue type. A vertex flips to the color of a randomly chosen southwest nearest neighbor at exponential rate 2. At time zero there is one Red particle located at (1,0) and one Blue particle located at (0,1). The main result is a partial shape theorem: Denote by $R(t)$ and $B(t)$ the red and blue regions at time~t. Then (i) eventually the upper half of the unit square contains no points of $B(t)/t$, and the lower half no points of $R(t)/t$; and (ii) with positive probability there are angular sectors rooted at (1,1) that are eventually either red or blue. The second result is contingent on the uniform curvature of the boundary of the corresponding Richardson shape.

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