

Non-existence of bi-infinite polymer Gibbs measures on \mathbb{Z}^2

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To each vertex $x \in \mathbb{Z}^2$ assign a positive weight ω_x . A geodesic between two ordered points on the lattice is an up-right path maximizing the cumulative weight along itself. A bi-infinite geodesic is an infinite path taking up-right steps on the lattice and such that for every two points on the path, its restriction to between the points is a geodesic. Assume the weights across the lattice are i.i.d., does there exist a bi-infinite geodesic with some positive probability? In the case the weights are Exponentially distributed, we answer this question in the negative. We show an analogous result for the positive-temperature variant of this model. Joint work with Márton Balázs and Timo Seppäläinen.