

Extremal decomposition of the Ising free state on regular trees... and overlaps

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At very low temperature, the free state of the Ising model on regular trees is not extremal.

Moreover, its extremal decomposition is a continuous measure, supported on (uncountably many) inhomogeneous extremal states, which have some kind of “glassy” feature.

I will present a proof of this result, which provides explicit concentration bounds on “branch overlaps”, playing the role of an order parameter for typical extremals.

This is in some sense a result of sensibility of the overlap to a resampling of the boundary condition (under the free measure). The proof extends quite generally to ferromagnetic finite-spin models, even slightly asymmetric (i.e. where small inhomogeneous field terms are added), which shows that the above behaviour is generic on regular trees.

This is a work in progress in collaboration with Arnaud Le Ny (UPEC) and Christof Külske (Bochum).