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Uniqueness and non-uniqueness for spin-glass ground states on trees. (English)

Summary: We consider a spin glass at temperature $T = 0$ where the underlying graph is a locally finite tree. We prove for a wide range of coupling distributions that uniqueness of ground states is equivalent to the maximal flow from any vertex to $\infty$ (where each edge $e$ has capacity $|J_e|$) being equal to zero which is equivalent to recurrence of the simple random walk on the tree.

MSC:

60K37 Processes in random environments
05C21 Flows in graphs
05C81 Random walks on graphs
82B44 Disordered systems (random Ising models, random Schrödinger operators, etc.) in equilibrium statistical mechanics

Keywords:
spin glass; Edwards-Anderson model; ground state; trees; max-flow min-cut; recurrence; transience

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References:


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