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The Glauber Dynamics for Colourings of Bounded Degree Trees

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We study the Glauber dynamics Markov chain for k-colourings of trees with maximum degree Δ. We show that for each $k \geq 3$, the mixing time on the complete tree is $n^{\Theta(1+\Delta/(k \log \Delta))}$. We also show that the mixing time on *every* tree is at most $n^{O(1+\Delta/(k \log \Delta))}$. Our proof uses a weighted canonical paths analysis and a variation of the block dynamics in which we exploit the differing relaxation times of blocks.

This is joint with Brendan Lucier and Yuval Peres.