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Colouring regular bipartite graphs, cubes and grids

What can we say about a uniform q -colouring of a regular bipartite graph? Quite a bit, it transpires, despite the question's vagueness. For example, if q is even then with high probability all colour classes are (essentially) the same size.

Given more structure, we can say more. For example, we have a precise description of the colour classes in a random colouring of the hypercube.

Beyond the hypercube is the integer lattice, and a decades old conjecture of Kotecky that has only recently seen progress.

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