

Isoperimetry in integer lattices

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The edge isoperimetric problem for a graph G is to determine, for each n , the minimum number of edges leaving any set of n vertices. Exact solutions are known only in special cases, for example when G is the usual integer lattice. The most natural open problem was to answer this question for the ‘strong lattice’, with edges between points at l_∞ distance 1. Whilst studying this question we in fact solved the edge isoperimetric problem asymptotically for every Cayley graph on \mathbb{Z}^d . I’ll talk about how to go from the specification of a lattice to a corresponding near-optimal shape, for both this and the related vertex isoperimetric problem. Joint work with Joshua Erde.