

Induced subgraphs of \mathbb{Z}^2 and related extremal graphs

Geir Agnarsson, George Mason University, Fairfax VA – 22030

Abstract

We prove in a new way that the maximum number of edges an induced subgraph of the 2-grid \mathbb{Z}^2 on n vertices is given by $E_2(n) = \lfloor 2n - \sqrt{2n} \rfloor$. This was first proved by Harary and Harborth in 1976 by induction. Our method suggests some possible ways to obtain analog results in higher dimensions via projections and the *Box Theorem* by Bollobás and Thomas from 1995. – We discuss some of these key tools and related results in discrete geometry.

Keywords: grid graph, induced subgraph, Box Theorem.