

Two Needles from Exponential Haystacks

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Abstract

Erdős Magic proves the existence of an object but where is it? When the random object has only exponentially small chance of working this is especially challenging. The last years have seen two great successes.

Lovász! Moser, followed by Tardos and others, have given an amazingly simple algorithm (the proof of correctness is not so simple!) to find objects whose existence is assured by the Lovász Local Lemma.

Six Suffice! Many years ago this speaker showed that n sets on n points could be two colored so that all discrepancies were at most $6\sqrt{n}$ and long conjectured that no algorithm was possible. Wrong! Bansal, using semidefinite programming in a very nice extension of Goemans-Williamson ideas, finds the coloring . . . and much more.