Combinatorics Seminar

Proof of the Middle Levels Conjecture

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Abstract: Define the middle layer graph as the graph whose vertex set consists of all bitstrings of length $2n+1$ that have exactly n or $n+1$ entries equal to 1, with an edge between any two vertices for which the corresponding bitstrings differ in exactly one bit. The middle levels conjecture asserts that this graph has a Hamilton cycle for every $n \geq 1$. This conjecture originated probably with Havel, Buck and Wiedemann, but has also been (mis)attributed to Dejter, Erdos, Trotter and various others, and despite considerable efforts it remained open during the last 30 years. In this talk I present a proof of the middle levels conjecture. In fact, I show that the middle layer graph has $2^{2^{\Omega(n)}}$ different Hamilton cycles, which is best possible.

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