

*Department of Mathematics,  
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# Math 269 - Combinatorics

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## Sparse Kneser graphs are Hamiltonian

**Abstract:**

For integers  $k \geq 1$  and  $n \geq 2k + 1$ , the *Kneser graph*  $K(n, k)$  is the graph whose vertices are the  $k$ -element subsets of  $\{1, \dots, n\}$  and whose edges connect pairs of subsets that are disjoint. The Kneser graphs of the form  $K(2k + 1, k)$  are also known as the *odd graphs*. We settle an old problem due to Meredith, Lloyd, and Biggs from the 1970s, proving that for every  $k \geq 3$ , the odd graph  $K(2k + 1, k)$  has a Hamilton cycle. The proof is based on a reduction of the Hamiltonicity problem in the odd graph to the problem of finding a spanning tree in a suitably defined hypergraph on Dyck words. As a byproduct, we obtain a new proof of the so-called middle levels conjecture. This is joint work with Torsten Mtze and Jerri Nummenpalo.

Host: Andrew Suk

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**2:00 PM**

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