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Hamilton Cycles in 1-Block-Intersection Graphs

Given a $\mathrm{BIBD}(v, k, \lambda)$, $\mathcal{D}$ say, with $\lambda > 1$ and having block set $\mathcal{B}$, the i-block-intersection graph of $\mathcal{D}$ is the graph $G_i(\mathcal{D})$ having vertex set $\mathcal{B}$ such that two vertices b_1 and b_2 are adjacent in $G_i(\mathcal{D})$ if and only if $|b_1 \cap b_2| = i$. It has been known since 1999 that the 1-block-intersection graph of any λ-fold triple system on $v \geq 12$ points is Hamiltonian. We now show that the 1-block-intersection graphs of $\mathrm{BIBD}(v, k, \lambda)$ with block size $k = 4$ are Hamiltonian when v is sufficiently large.

This is joint work with Andrew Jesso and Nabil Shalaby of Memorial University of Newfoundland.