Hamiltonian Cycles on Coverings

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A covering design is a v-set V and a list B of b blocks of size k where every pair from V must occur in at least one block. A 1-block intersection graph (1-BIG) is a graph $G = (B, E)$, where $b \in B$ and $(b, b') \in E$ if $|b \cap b'| = 1$ for $b, b' \in B$. This talk will go over what independence sets look like in a 1-BIG based on coverings with $k = 3$. We prove that optimal $k = 3$ coverings $v \equiv 5 \pmod 3$ have a Hamiltonian cycle and show why this proof fails for even v that are not Steiner Triple Systems.

References

[1] V. Chvátal, P. Erdös, A Note on Hamiltonian Circuits, *Discrete Math.* 1972 pp.111-113.

[2] P. Horák, A. Rosa, Decomposing Steiner Triple Systems into Small Configurations, *ARS Comb.* 1988 pp.91-105.