

Patrick Morris

Free University Berlin

RYSER'S CONJECTURE FOR t -INTERSECTING HYPERGRAPHS

A well-known conjecture, often attributed to Ryser, states that every r -partite r -uniform hypergraph has cover number at most $(r - 1)$ times its matching number. Despite considerable effort, this conjecture remains wide open, motivating the pursuit of variants of the original conjecture. Recently, Király and Tóthmérész, and independently Bustamante and Stein, considered the problem under the assumption that the hypergraph is t -intersecting, conjecturing that the cover number $\tau(\mathcal{H})$ of such a hypergraph \mathcal{H} is at most $r - t$. This conjecture was proven for all $r \leq 4t - 1$.

In this talk, we discuss extensions of this result. For $r \leq 3t - 1$, we prove a tight upper bound on the cover number of these hypergraphs, showing that they in fact satisfy $\tau(\mathcal{H}) \leq \lfloor (r - t)/2 \rfloor + 1$ and there is a matching construction. We also discuss upper bounds and constructions for other values of (r, t) . In particular, we extend the range of t for which the conjectured upper bound of $r - t$ is known to be true, showing that it holds for all $r < \frac{36}{7}t - 5$.

This is joint work with Anurag Bishnoi, Shagnik Das and Tibor Szabó.