

Conflict-free hypergraph matchings

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A celebrated theorem of Pippenger, and Frankl and Rödl states that every almost-regular, uniform hypergraph H with small maximum codegree has an almost-perfect matching. We extend this result by obtaining a conflict-free matching, where conflicts are encoded via a collection C of subsets $C' \subseteq E(H)$. We say that a matching $M \subseteq E(H)$ is conflict-free if M does not contain an element of C as a subset. Under natural assumptions on C , we prove that H has a conflict-free, almost-perfect matching. This has many applications, one of which yields new asymptotic results for so-called “high-girth” Steiner systems. Our main tool is a polynomial time random greedy algorithm which we call the “conflict-free matching process”.