

Abstract

Let $P(M)$ be the matroid base polytope of a matroid M . A matroid base polytope decomposition of $P(M)$ is a decomposition of the form $P(M) = \bigcup_{i=1}^t P(M_i)$ where each $P(M_i)$ is also a matroid base polytope for some matroid M_i , and for each $1 \leq i \neq j \leq t$, the intersection $P(M_i) \cap P(M_j)$ is a face of both $P(M_i)$ and $P(M_j)$.

In this talk, we shall discuss some results on hyperplane splits, that is, polytope decompositions when $t = 2$. We present sufficient conditions for M so $P(M)$ has a hyperplane split and a characterization when $P(M_1 \oplus M_2)$ has a hyperplane split where $M_1 \oplus M_2$ denote the direct sum of matroids M_1 and M_2 . We also show that $P(M)$ has not a hyperplane split if M is binary. Finally, we prove that $P(M)$ has not a decomposition if its 1-skeleton is the hypercube.