ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

13. Combinatorics

1991 MS Classification: 52C22, 52B99
Rambau, Jörg, Konrad-Zuse-Zentrum für Informationstechnik Berlin, Germany; Huber, Birkett, Texas A&M University, USA; Santos, Francisco, Universidad de Cantabria, Santander, Spain

A new View on the Cayley Trick

It is known that there is a natural one-to-one correspondence between the mixed subdivisions of a Minkowski sum of polytopes and the subdivisions of their Cayley embedding. We extend the Cayley Trick to the case where all subdivisions are induced by general polytope projections. This implies a strong isomorphism between the corresponding fiber polytopes. One application of the Cayley Trick is to describe subdivisions of high-dimesional polytopes in terms of mixed subdivisions of low-dimesional polytopes. Application to Lawrence polytopes and zonotopal tilings leads to a new proof of the Bohne-Dress-Theorem in oriented matroid theory. (Manuscript available on demand.)