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Chip-Firing on Simplicial Complexes and Matroids

Abstract for the Combinatorics Seminar 2019 Tuesday, April 30

The critical group and its relation to spanning trees has been studied extensively in the graphical setting in the context of chip-firing. A more recent area of research has been to generalize chip-firing results to a larger class of objects. In this talk, we explore chip-firing on simplicial complexes as well as regular matroids. Through combining these topics, we produce a bijective proof for Duval-Klivans-Martin's Simplicial Matrix Tree Theorem on a particular class of simplicial complexes. This bijection provides representatives for the elements of the critical groups for these complexes that depend only on a vertex ordering. This talk does not assume any prior knowledge of chip-firing or matroids.

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