Cellular Automorphisms of Surfaces and Self-Duality

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008 Kemeny Hall, 4:00 pm
(Tea 3:30 pm 300 Kemeny Hall)

Abstract

Given a graph G cellularly embedded in a closed surface S, an automorphism of G is called a cellular automorphism of G in S when, loosely speaking, it takes facial boundary walks to facial boundary walks. I will describe how we constructed complete catalogs of all irreducible cellular automorphisms of the sphere, projective plane, torus, Klein bottle, and three-crosscaps surface for a particular notion of reducibility related to taking minors.

We have also determined concrete procedures sufficient for constructing all possible self-dual embeddings in any closed surface S given a catalog of all irreducible cellular automorphisms in S. I will illustrate by way of examples some of these procedures and some resulting self-dual graphs.

This talk should be accessible to graduate students.

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