## A CRITICAL GROUP FOR EMBEDDED GRAPHS: WORKING WITH MAPS IN COLLABORATION WITH CRIEL MERINO AND STEVEN D. NOBLE

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ABSTRACT. Critical groups are finite Abelian groups associated with graphs. They are well-established in combinatorics, closely related to the graph Laplacian and arise in several contexts such as chip firing and parking functions. The order of the critical group of a connected graph is equal to its number of spanning trees, a fact equivalent to Kirchhoff's Matrix–Tree Theorem.

How should we define critical groups for graphs embedded in surfaces, rather than for graphs in the abstract? This is the first of two talks in which we answer this question. (Steve Noble will give the second talk.)

In this talk the emphasis will be on topological graph theory, and the interactions of the problem with Chumtov's partial-duals, one-face subgraphs, and a Matrix–quasi-Tree Theorem of Macris and Pule.

Both talks will stand alone, so don't worry if you miss either one!

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