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Topological Representations of Matroid Maps

Abstract for the Combinatorics Seminar 2011 April 12

The Topological Representation Theorem for matroids states that every matroid can be realized as an arrangement of codimension-one homotopy spheres on a sphere. Anderson and Engstrom, independently, showed how to explicitly construct such an arrangement for any given matroid. I will show that the structure-preserving maps between matroids induce topological mappings between their representations using Engstrom's construction. Specifically, I will show that weak maps induce continuous, (**Z**/2**Z**)-equivariant maps which weakly decrease Betti numbers. If time permits, I will also discuss how this process yields a functor from the category of matroids with weak maps to the homotopy category of topological spaces.

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Last update: 2020/01/29 19:03