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Topological Representations of Matroid Maps

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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.
