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Title: Überhomology of simplicial complexes

Abstract: We introduce a natural filtration on the simplicial homology of a finite simplicial complex X using bi-colourings of its vertices. This yields two dual homology theories, which generalise simplicial homology and are closely related to discrete Morse matchings on X. We show that, by organising the horizontal homologies of a simplicial complex in the poset of its colourings, we obtain a triply graded homology theory which we call überhomology. This latter homology is not a homotopy invariant, but nonetheless encodes both combinatorial and topological information on X. Time permitting we'll talk about a recent collaboration with Caputi and Collari, relating a specialisation of the überhomology to connected dominating sets in graphs.