CENTRE
DE RECHERCHES
MATHÉMATIQUES

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Bi-Filtrations for 2-Morse Functions

We study the homotopy type of bi-filtrations of compact manifolds M induced as the pre-image of filtrations the plane for generic smooth functions $f : M \to \Real^2$. Our primary goal is to provide a simple geometric description of the multi-graded persistent homology associated with such filtrations. The main result is a description of the evolution of the bi-filtration of f in terms of cellular attachments. A concept of persistence path is introduced, analogies of Morse-Conley equation and Morse inequalities along persistence paths are derived. A scheme for computing path-wise barcodes is proposed.

This is a joint work with Ryan Budney.