"Adaptive Discretisation of Liftings for Curvature Regularization"

Abstract:

Curvature regularization of image level lines is a powerful tool in image processing. Using so-called functional lifting, this can be achieved by specific convex functionals in a higher-dimensional space. We present the derivation of such a functional for 2D- and 3D-images and how it can be used in image processing. A major challenge in solving the resulting higher-dimensional problem are the corresponding high computational costs. We present an adaptive finite element approach with a local primal-dual gap as the refinement indicator and a second approach using line measures instead of finite elements functions for discretisation.