

# Optimal interpolation data for PDE-based compression of images with noise

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## Abstract

We introduce and discuss shape-based models for finding the best interpolation data in the compression of images with noise. The aim is to reconstruct missing regions by means of minimizing a data fitting term in the L2-norm between the images and their reconstructed counterparts using time-dependent PDE inpainting. We analyze the proposed models in the framework of the  $\Gamma$ -convergence from two different points of view. First, we consider a continuous stationary PDE model, obtained by focusing on the first iteration of the discretized time-dependent PDE, and get pointwise information on the "relevance" of each pixel by a topological asymptotic method. Second, we introduce a finite dimensional setting of the continuous model based on "fat pixels" (balls with positive radius), and we study by  $\Gamma$ -convergence the asymptotics when the radius vanishes. Numerical computations are presented that confirm the usefulness of our theoretical findings for non-stationary PDE-based image compression.