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Title: A Spectral Perspective on Shapes

Abstract:

The differential structure of surfaces captured by the Laplace Beltrami Operator (LBO) can be used to construct a space for analyzing visual and geometric information. The decomposition of the LBO at one end, and the heat operator at the other end provide us with efficient tools for dealing with images and shapes. Denoising, matching, segmenting, filtering, exaggerating are just few of the problems for which the LBO provides a convenient operating environment. We will review the optimality of a truncated basis provided by the LBO, and a selection of relevant metrics by which such optimal bases are constructed. A specific example is the scale invariant metric for surfaces, that we argue to be a natural choice for the study of articulated shapes and forms.