THEORY AND ALGORITHMS FOR ANISOTROPIC TRIANGULATIONS WITH APPLICATIONS TO IMAGE REPRESENTATIONS.

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We present the first results of an ongoing project revolving around approximation by finite element functions on adaptive and anisotropic triangulations, with application to image processing.

We first recall the available theory for isotropic triangulations which involves Besov-Sobolev spaces. For anisotropic triangulations, we present an analytic criterion that governs the rate of convergence in L^p norms for optimally built triangulations. We propose a greedy algorithm which has the ability to generate triangulations that exhibit a locally optimal aspect ratio and prove that the optimal convergence rate is met by the algorithm. We also present applications to image representation and compression.