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Threshold Dynamics for Willmore Flow

Many important models of image processing and computer vision involve curvature-dependent functionals. The minimization of these functionals can involve the solution of fourth order geometric PDEs. The numerical solution of such PDEs with standard methods can be very costly.

Recently, Grzibovskis and Heintz (2005) proposed a threshold dynamics algorithm that approximates the gradient flow for an important curvature dependent functional known as the Willmore energy. This energy consists of the integral of the square of a surface's mean curvature over that surface. Furthermore, it constitutes an essential part of certain variational image models for segmentation with depth, disocclusion, and image inpainting. This talk discusses our recent work on practical threshold dynamics algorithms for Willmore Flow and the application of these algorithms to higher order models of image processing and computer vision.

This is joint work with Selim Esedoglu and Richard Tsai.