

Evolution of manifolds with a specially designed tangential component

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We focus on Lagrangian models of manifold evolution and discuss their various applications as well as some important issues concerning their discrete solutions. Contrarily to the level-set approach, Lagrangian models describe the evolution of a manifold explicitly which has both advantages and drawbacks. We focus on the problem of controlling the discretization mesh quality during the computation, which seems to be crucial, if we want to obtain a good approximation of the solution to the continuous problem. We present a technique for designing a special tangential component of the evolution velocity field that allows us to adjust the mesh according to our needs as the discretized manifold evolves. For example, we can converge to a mesh with equally sized elements or to modify the density of the grid points according to the curvature of the manifold. We present various practical examples concerning curve and surface evolution.