

ABSTRACT ENGLISH

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Geometry and analysis of shape space. The simplest shapes are silhouettes in the plane. More precisely, shape space is the orbit space under the action of the reparameterization group (the diffeomorphism group of the circle) of the space of all regular immersed closed curves in the plane. One wants to find good Riemannian metrics on shape space which allow applications in pattern recognition and vision. One approach is to look for Riemannian metrics on the space of immersed curves which are invariant under the reparameterization group. The aim of this project is to push forward the results in the case of plane curves, and to investigate the higher dimensional setting. Of particular interest is the case of surfaces in 3-space.

Related research directions. To study the geometry and the analytical structure of orbit spaces in general. For example, one tries to arrange the roots of a sufficiently differentially parameterized family of polynomials in such a way, that they are as differentiable as possible.

To study questions of infinite dimensional differential geometry which arise in the study of shape spaces.