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Title. **Manifold-valued thin-plate splines and the topology of manifold-valued mappings**

Abstract. In recent years a growing trend in machine learning is to go beyond the standard setting of classification and regression and to learn also in structured output spaces e.g. trees or graphs. In this talk I will focus on another type of structured output learning, namely where the output space is a Riemannian manifold. We present a generalization of thin-plate splines for interpolation and approximation of manifold-valued data. The cornerstone of our theoretical framework is an energy functional for mappings between two Riemannian manifolds which is independent of parameterization and respects the geometry of both manifolds. If the manifolds are Euclidean, the energy functional reduces to the classical thin-plate spline energy. Apart from showing example applications in computer graphics, I will discuss also the non-trivial topology of manifold-valued mappings which opens up new questions in the realm of topology learning.