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Vladimir Delengov* (delengov@gmail.com) and **Chiu-Yen Kao**. *Computing Eigenmodes of Laplace-Beltrami Operator by Using Radial Basis Functions.*

In this work, a numerical approach based on meshless methods is proposed to obtain eigenmodes of Laplace-Beltrami operator on manifolds, and its performance is compared against existing alternative methods. Radial Basis Function (RBF)-based methods allow one to obtain interpolation and differentiation matrices easily by using scattered data points. We derive expressions for such matrices for the Laplace-Beltrami operator via so-called Reilly's formulas and use them to solve the respective eigenvalue problem. Numerical studies of proposed methods are performed in order to demonstrate convergence on simple examples of one-dimensional curves and two-dimensional surfaces. (Received September 19, 2018)