RESEARCH

Eigenvalue problems on manifold and changes of mesh

Kuan Yang[1,4]*, Junhao Chen[2], Tianyi Wan[3] and Xianyue Li[1]*

*Correspondence:
yangk2017@lzu.edu.cn;
lixianyue@lzu.edu.cn
[1]School of Mathematics and
Statistics, Lanzhou University,
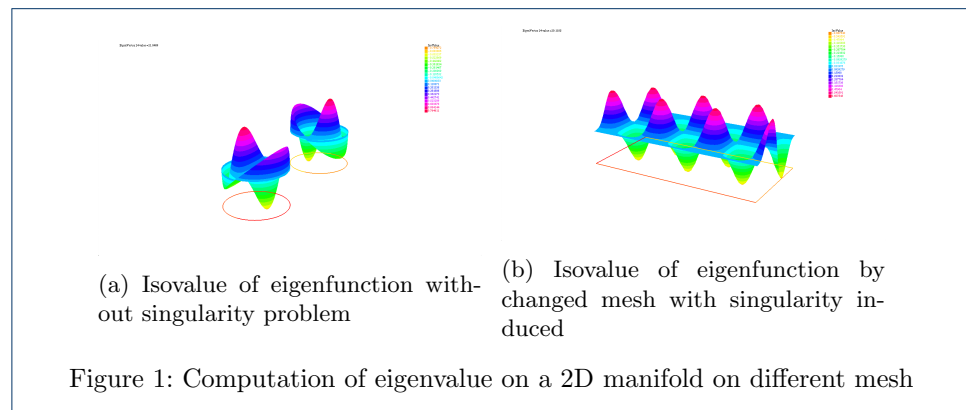Lanzhou, Gansu, China
Full list of author information is
available at the end of the article

Abstract

Eigenvalue problems for speed and energy distribution on manifold are introduced, which advises the design of aircraft to enhance the structural stability and fuel economy. For the computation of the eigenvalue problems, mesh generation methods are proposed to support finite-element solution. Generation of mesh are changed to compare and maximize the efficiency, stability and precision in computation to in particular adapt to manifold with sharp and local properties. The mesh generation method could be expanded for the computation occurred in optimization issues in state-of-art industrial design.

Keywords: Mesh Generation; Mesh Adaptation; Finite Element; Eigenvalue Problem

Figures

(a) Isovalue of eigenfunction without singularity problem

(b) Isovalue of eigenfunction by changed mesh with singularity induced

Figure 1: Computation of eigenvalue on a 2D manifold on different mesh

Author details
[1]School of Mathematics and Statistics, Lanzhou University, Lanzhou, Gansu, China. [2]School of Mechanical Engineering, University of Leeds, Leeds, England, UK. [3]School of Mathematics and Statistics, Huazhong University of Science and Technology, Wuhan, Hubei, China. [4]Cuiying Honors College, Lanzhou University, Lanzhou, Gansu, China.

References