Buttazzo, Giuseppe; Pratelli, Aldo
An application of the continuous Steiner symmetrization to Blaschke-Santaló diagrams. (English)  

Summary: In this paper we consider the so-called procedure of Continuous Steiner Symmetrization, introduced by F. Brock [Proc. Indian Acad. Sci., Math. Sci. 110, No. 2, 157–204 (2000; Zbl 0965.49002); Math. Nachr. 172, 25–48 (1995; Zbl 0886.49010)]. It transforms every open set $\Omega \subset \subset \mathbb{R}^d$ into the ball keeping the volume fixed and letting the first eigenvalue and the torsional rigidity respectively decrease and increase. While this does not provide, in general, a $\gamma$-continuous map $t \mapsto \Omega_t$, it can be slightly modified so to obtain the $\gamma$-continuity for a $\gamma$-dense class of domains $\Omega$, namely, the class of polyhedral sets in $\mathbb{R}^d$. This allows to obtain a sharp characterization of the Blaschke-Santaló diagram of torsion and eigenvalue.

MSC:
49Q10 Optimization of shapes other than minimal surfaces  
49J45 Methods involving semicontinuity and convergence; relaxation  
49R05 Variational methods for eigenvalues of operators  
35P15 Estimates of eigenvalues in context of PDEs  
35J25 Boundary value problems for second-order elliptic equations  
26D10 Inequalities involving derivatives and differential and integral operators

Keywords: Blaschke-Santaló diagrams; continuous Steiner symmetrization; torsional rigidity; principal eigenvalue; 0886.49010

Full Text: DOI arXiv

References:

Edited by FIZ Karlsruhe, the European Mathematical Society and the Heidelberg Academy of Sciences and Humanities © 2022 FIZ Karlsruhe GmbH


This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.