Guimarães, O.; Labecca, W.; Piqueira, José R. C.
Solving 2nd order BVPs in planar irregular domains. (English) Zbl 07545892

Summary: This paper presents a pseudo-spectral method to solve PDEs in univocally describable irregular planar domains in polar coordinates, using a simple relationship that transforms the problem for the classic case in the unit circle, equipped with an orthogonal bivariate basis and complete in Sobolev sense. Given its generality, it applies to elliptical, parabolic or hyperbolic PDEs in Robin’s condition. The choice of Radau points applied here allows the exclusion of the singularity in the origin and a posteriori error estimate also here developed provides us sharp error bounds of the numerical solution.

MSC:
65-XX Numerical analysis
35-XX Partial differential equations

Keywords:
boundary value problems; Chebyshev bases; Fourier series; operational matrices; spectral methods

Full Text: DOI

References:
[17] Lanz, Colleen B., The Use of Schwarz-Christoffel Transformations in Determining Acoustic Resonances the Use of Schwarz-Christoffel Transformations (2010), Virginia Polytechnic Institute and State University, (Ph.D. thesis)


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.