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Eigenvalues and eigenfunctions of the Laplace operator on an equilateral triangle for the discrete case. (English) [Zbl 1059.65101](#)

Appl. Math., Praha 46, No. 3, 231-239 (2001).

The author gives explicit formulas for eigenvalues and a complete orthogonal system of eigenvectors of a discretized boundary value problem for the Laplace equation with either Dirichlet or Neumann boundary conditions on an equilateral triangle with a triangular mesh. The technique is analogous to the author's previous paper [ibid. 43, No. 4, 311–320 (1998; [Zbl 0940.35059](#))] in which it was calculated for the continuous case. It is shown that the eigenvalues from the discrete case converge to the ones in the continuous case when the mesh is refined. The problem is transformed to a rectangle and explicit formulas for all eigenvalues and eigenvectors are given.

Reviewer: Jan Zítko (Praha)

MSC:

- [65N25](#) Numerical methods for eigenvalue problems for boundary value problems involving PDEs
- [35J05](#) Laplace operator, Helmholtz equation (reduced wave equation), Poisson equation
- [65N06](#) Finite difference methods for boundary value problems involving PDEs
- [35P10](#) Completeness of eigenfunctions and eigenfunction expansions in context of PDEs

Cited in **1** Document

Keywords:

discrete Laplace operator; discrete boundary value problem; eigenvalue; eigenvector

Full Text: [DOI](#) [EuDML](#)

References:

- [1] M. Práger: Eigenvalues and eigenfunctions of the Laplace operator on an equilateral triangle. *Appl. Math.* 43 (1998), 311-320. · [Zbl 0940.35059](#) · [doi:10.1023/A:1023269922178](#)

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