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Fourier expansion-based differential quadrature and its application to Helmholtz eigenvalue problems. (English) Zbl 0886.65109

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Authors' abstract: Based on the same concept as generalized differential quadrature, the method of Fourier expansion-based differential quadrature (FDQ) is developed and then applied to solve the Helmholtz eigenvalue problems with periodic and non-periodic boundary conditions. In FDQ, the solution of a partial differential equation is approximated by a Fourier series expansion. The details of the FDQ method and its implementation to sample problems are shown. It is found that the FDQ results are very accurate for the Helmholtz eigenvalue problems even though very few grid points are used.

Reviewer: P.Burda (Praha)

MSC:

65N25 Numerical methods for eigenvalue problems for boundary value problems involving PDEs
65N35 Spectral, collocation and related methods for boundary value problems involving PDEs
35P15 Estimates of eigenvalues in context of PDEs

Keywords:

method of Fourier expansion-based differential quadrature; Helmholtz eigenvalue problems

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