

## TOWARD THE SINC-GALERKIN METHOD FOR THE POISSON PROBLEM IN ONE TYPE OF CURVILINEAR COORDINATE DOMAIN\*

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**Abstract.** This paper introduces the Sinc-Galerkin method for the Poisson problem in one type of curvilinear coordinate domain and shows an example of the numerical results. The method proposed in this paper transforms the domain of the Poisson problem designated by the curvilinear coordinates into a square domain. In this process, Poisson's equation is transformed into a more general two-variable second-order linear partial differential equation. Therefore, this paper also shows a unified solution for general two-variable second-order linear partial differential equations. The derived matrix equation is represented by a simple matrix equation by the use of the Kronecker product. However, the implementation for real applications requires a more efficient calculation of the matrix equation.

**Key words.** Sinc-Galerkin method, Sinc methods, Poisson problem, differential equations.

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