

Department	Dept. of Information Science Faculty of Science and Engineering	Name	Teruya Minamoto
Research Subject	Numerical method with guaranteed accuracy of solutions for partial differential equations		
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Survey of the work

In recent years, several methods to the numerical proof of existence of solutions for various differential equations have been developed. These methods are known as new numerical approach for the problems that are difficult to prove analytically the existence of solutions for differential equations.

Concerning ordinary differential equations, there are several methods based on interval arithmetic. For partial differential equations, however, there are very few approaches. Therefore, we develop a method, which ensures the existence and uniqueness of partial differential equations.

Features of the work

The main aim of this work is to ensure mathematically the existence and uniqueness of a solution for nonlinear partial differential equations using computer.

This work is the very challenging, because it is very difficult or impossible to prove mathematically the existence of a solution for nonlinear partial differential equations analytically, in general. Moreover, we can obtain the error bound between a numerical solution and its exact solution. Therefore, our method can guarantee the accuracy of a numerical solution.

It seems that the computer's performance improves extremely in future, and all studies in numerical computations tend to consider accuracy or precision. Therefore, the numerical method with guaranteed accuracy will be very important in future.