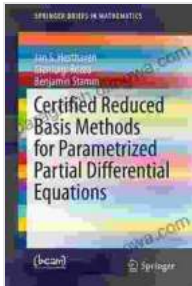


Certified Reduced Basis Methods For Parametrized Partial Differential Equations



Certified Reduced Basis Methods for Parametrized Partial Differential Equations (SpringerBriefs in Mathematics) by Jan S Hesthaven

★★★★★ 5 out of 5

Language : English

File size : 4278 KB

Print length : 144 pages

Screen Reader : Supported



Reduced basis methods are a class of Galerkin methods that use a reduced basis, which is a subspace of the full finite element space, for approximating the solution of parametrized partial differential equations. Reduced basis methods have been shown to be efficient and accurate for a wide variety of parametrized partial differential equations, and they have been used to solve problems in a variety of different fields, including fluid dynamics, solid mechanics, and heat transfer.

Certified reduced basis methods are a specific type of reduced basis methods that provide certified bounds on the error of the approximation. This is in contrast to traditional reduced basis methods, which only provide estimates of the error. Certified reduced basis methods are able to provide certified bounds on the error because they use a posteriori error estimation techniques to compute the error of the approximation.

This book provides an introduction to certified reduced basis methods for parametrized partial differential equations. The book covers the mathematical foundations of certified reduced basis methods, as well as their application to a variety of different parametrized partial differential equations.

Mathematical Foundations

The mathematical foundations of certified reduced basis methods are based on the theory of Galerkin methods. Galerkin methods are a class of numerical methods that use a finite-dimensional subspace of the full solution space to approximate the solution of a partial differential equation. Reduced basis methods are a specific type of Galerkin method that use a reduced basis, which is a subspace of the full finite element space, for approximating the solution of parametrized partial differential equations.

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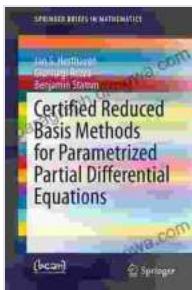
Applications

Certified reduced basis methods have been used to solve a variety of different parametrized partial differential equations. These include:

* Fluid dynamics * Solid mechanics * Heat transfer * Electromagnetics *
Chemical reactions

Certified reduced basis methods have been shown to be efficient and accurate for a wide variety of parametrized partial differential equations. They have been used to solve problems in a variety of different fields, including aerospace engineering, automotive engineering, and biomedical engineering.

This book provides an to certified reduced basis methods for parametrized partial differential equations. The book covers the mathematical foundations of certified reduced basis methods, as well as their application to a variety of different parametrized partial differential equations. Certified reduced basis methods are a powerful tool for solving parametrized partial differential equations, and they have the potential to be used to solve a wide range of problems in a variety of different fields.



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