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titles that will inevitably find their way onto open publishing platforms (though a book has to be really quite poor to receive less than four stars).

### **Discontinuous Galerkin Methods For Solving**

Discontinuous Galerkin (DG) methods for solving partial differential equations,

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developed in the late 1990s, have become popular among computational scientists. This book covers both theory and computation as it focuses on three primal DG methods — the symmetric interior penalty Galerkin, incomplete interior penalty Galerkin, and nonsymmetric interior penalty Galerkin — which are variations of interior



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## **Discontinuous Galerkin Methods for Solving Elliptic and ...**

In applied mathematics, discontinuous Galerkin methods form a class of numerical methods for solving differential equations. They combine features of the finite element and the

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finite volume framework and have been successfully applied to hyperbolic, elliptic, parabolic and mixed form problems arising from a wide range of applications. DG methods have in particular received considerable interest for problems with a dominant first-order part, e.g. in electrodynamics, fluid mechanics and plasma ph

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## **Discontinuous Galerkin method - Wikipedia**

Discontinuous Galerkin method is a finite element method in which the solution is approximated by piecewise continuous functions within the element with no global continuity requirement. Thus the numerical solution is discontinuous

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across the element interfaces.

## **Discontinuous Galerkin Method for Solving ...**

Several discontinuous Galerkin (DG) methods are introduced for solving a frictional contact problem with normal compliance, which is modeled as a quasi-variational inequality. Consistency,

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boundedness, and stability are established for the DG methods. Two numerical examples are presented to illustrate the performance of the DG methods. ARTICLE HISTORY

## **Discontinuous Galerkin Methods for Solving a Frictional ...**

Discontinuous Galerkin methods difier

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from the standard finite element methods in that functions are allowed to be discontinuous across the element boundaries. Since no inter- element continuity is required, DG methods allow general meshes with hanging nodes and elements of different shapes.

## **Discontinuous Galerkin Methods for**

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We study discontinuous Galerkin methods for solving elliptic variational inequalities of both the first and second kinds. Analysis of numerous discontinuous Galerkin schemes for elliptic boundary value problems is extended to the variational inequalities.

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In this paper, a third-order reconstructed discontinuous Galerkin (DG) method based on a weighted variational minimization principle, which is denoted as (WVr) method, is presented for solving the incompressible flows on unstructured grids. In this method, the



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first-order degrees of freedom (DoFs) are obtained directly from the underlying second-order DG method, while the second-order DoFs are reconstructed through the weighted variational reconstruction.

**A third-order weighted variational reconstructed ...**

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$h$  may be discontinuous across cell interfaces. The discontinuous Galerkin (DG) method for solving (3.1) is defined as follows: find the unique function  $u_h \in V_k^h$  such that, for all test functions  $v_h \in V_k^h$  and all  $1 \leq i \leq N_x$  and  $1 \leq j \leq N_y$ , we have
 
$$\int_{\Omega} (a u_h (v_h)_x + b u_h (v_h)_y) dx dy + a \int_{y_{j-1/2}}^{y_{j+1/2}} u_h^2 dy - a \int_{y_{j-1/2}}^{y_{j+1/2}} u_h(x_{i+1/2}, y) v_h(x_{i+1/2}, y) dy - a \int_{y_{j-1/2}}^{y_{j+1/2}} u_h^2 dy$$

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$$y_{j+1/2} - y_{j-1/2} = u^{\wedge}$$

## **Discontinuous Galerkin Methods: General Approach and Stability**

In this section, we will present the discontinuous finite element space, the semi-discrete LDG scheme, and the implicit-explicit (IMEX) Runge-Kutta (RK) time-discretization methods. 2.1 The

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discontinuous finite element space Let  $\mathcal{T}_h = \{I_j = (x_{j-1/2}, x_{j+1/2})\}_{j=1}^N$  be a partition of  $\Omega$ , where  $x_{1/2} = a$  and  $x_{N+1/2} = b$  are the two boundary endpoints.

## **Local discontinuous Galerkin methods with explicit ...**

J.S. Hesthaven and T. Warburton, 2008,  
Nodal Discontinuous Galerkin Methods:

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Algorithms, Analysis, and Applications.  
Springer Texts in Applied Mathematics  
54, Springer Verlag, New York. XIV+500  
pages. Book webpage. Note: the book  
will be available in the campus bookshop  
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of the course.

## **Ph.D. Course on Nodal**

# Where To Download Discontinuous Galerkin Methods For Solving Elliptic **Discontinuous Galerkin Methods for** ... And Parabolic Equations

The discontinuous Galerkin methods have been developed and studied for solving the Navier-Stokes equations, e.g. [1, 2, 3], and the reference therein. Due to many advantages, recently, DG methods have been applied for solving variational inequalities [4, 5, 6, 7, 8, 9]. One

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major weakness of the DG methods is that more degree of freedom is needed.

## **Adaptive discontinuous Galerkin methods for solving an ...**

just for problem (1.1), the original discontinuous Galerkin finite element (DG) method was presented by Reed and Hill in 1973 [13]. Since then, many

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research works have been done for the DG method solving problem (1.1). The first mathematical analysis of this original DG method was given by Lesaint and Raviart [7]. They showed that

## **The Weak Galerkin Finite Element Method for the Transport ...**

Discontinuous Galerkin (DG) methods for



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solving partial differential equations, developed in the late 1990s, have become popular among computational scientists. Covering both theory and computation, this book focuses on three primal DG methods - the symmetric interior penalty Galerkin, incomplete interior penalty Galerkin, and nonsymmetric interior penalty Galerkin -

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which are variations of interior penalty methods.

## **Discontinuous Galerkin Methods for Solving Elliptic and ...**

[9] C. Johnson, J. Pitkaranta, An analysis of the discontinuous Galerkin method for a scalar hyperbolic equation, Math. Comp. 46 (1986) 1-26. [10] P. Lesaint,

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R.A. Raviart, On a finite element method for solving the neutron transport equation. In: Mathematical Aspects of Finite Elements in Partial Differential Equations. C. de Boor, ed.,

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**The Weak Galerkin Finite Element Method for the Symmetric ...**

DG method for discontinuous solutions

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Even though the major motivation to design the DG method for solving hyperbolic equations is to resolve discontinuous solutions more effectively, there are not..

## **Discontinuous Galerkin method for hyperbolic equations ...**

A discontinuous Galerkin (DG) method

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suitable for large-scale astrophysical simulations on Cartesian meshes as well as arbitrary static and moving Voronoi meshes is presented. Most major astrophysical fluid dynamics codes use a finite volume (FV) approach.

**A discontinuous Galerkin method for solving the fluid and ...**

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The DG method is known to enjoy mathematically provable high-order accuracy and stability, and the discontinuous feature of its approximation space makes it a good fit for parallel implementation and for handling unstructured meshes; see e.g. [12, 30, 31].

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## **A CONSERVATIVE DISCONTINUOUS GALERKIN METHOD FOR NONLINEAR**

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DG1D\_POISSON is a MATLAB library which uses the Discontinuous Galerkin Method (DG) to approximate a solution of the 1D Poisson Equation. The code was written by Beatrice Riviere. A 1D version of the Poisson equation has the

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form -  $(K(x) u'(x))' = f(x)$  for  $0 < x < 1$   
 $u(0) = 1$   $u(1) = 0$

## **DG1D\_POISSON - Discontinuous Galerkin Solution of 1D ...**

This project aims at the developments  
and improvements of high order  
accurate discontinuous Galerkin finite  
element methods for solving partial



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differential equations arising from DOE applications. Algorithm development, improvement, analysis, implementation and applications aspects are addressed.

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