

## **Hybridizable discontinuous Galerkin method for solving Caputo fractional boundary value problems**

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**Abstract:** In this work, we introduce Hybridizable discontinuous Galerkin method for the numerical solution of Caputo fractional differential equations. The first time, we use the method for solving fractional order boundary value problems. The method possesses several unique features which distinguish itself from other discontinuous Galerkin methods. At first, it reduces the number of globally coupled unknowns significantly when high order approximate polynomials are used. Secondly, it takes local solvers by using a Galerkin method to weakly enforce the equations on each element. We focus on the efficient implementation of the method and on the validation of its computational performance for one-dimensional fractional differential equations. By this way, we obtain some convergence results for this model problem.

**Keywords:** hybridizable discontinuous Galerkin Method, Caputo fractional operator, local solver, stabilization parameter.

### **References:**

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