



Prof. Dr. Leszek Demkowicz

Oden Institute, The University of Texas at Austin

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Ort: Reichenhainer Str. 90
Raum C10.113

Steepest Descent Method for Minimum Residual Methods for Nonlinear Problems

2025 marks the 17th anniversary of our first foundational paper on the Discontinuous Petrov-Galerkin method, in short the DPG method. In the talk, I will attempt to present an extension of the DPG concepts [1] to general nonlinear problems represented by a class of 2D nonlinear elasticity examples.

In context of the nonlinear elasticity, we will focus on two issues:

1. choice of a proper variational formulation;
2. comparison of Newton-Raphson and Steepest Descent methods.

[1] L. Demkowicz and J. Gopalakrishnan, The Discontinuous Petrov-Galerkin Method, Acta Numerica, 2025.

[2] J. Zhang and L. Demkowicz, Nonlinear Elasticity with the Discontinuous Petrov-Galerkin Method.
I. Various Variational Formulations, Oden Institute Report 2024/5.

[3] J. Zhang and L. Demkowicz, "Nonlinear elasticity with the Discontinuous Petrov-Galerkin method.
II. The Steepest Descent Method," Oden Institute Report 2025/1.