

# Lothar-Collatz-Seminar

Tue, 10. March 2026 · 11:00 · Geom 241

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## Gradient-robust flow modeling in the context of energy transfer

### Abstract:

Gradient-robust flow modeling in the context of mixed finite elements is a valuable approach for ensuring the invariance of the velocity with respect to gradient forces. A suitable modification of the discrete problem, proposed by Linke et al., cures the missing  $L^2$ -orthogonality by mapping discretely divergence-free functions to divergence-free ones by utilizing  $H(\text{div})$ -conforming finite element spaces. The applicability of this gradient-robust flow modeling was also shown in the context of PDE-constrained optimization by considering stationary incompressible Stokes equation (see work of Merdon and Wollner). In this talk we discuss the extension of these results to control problems constrained by a stationary incompressible Navier-Stokes equation.

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