KATHOLISCHE UNIVERSITÄT
EICHSTÄTT-INGOLSTADT

Einladung zum Gastvortrag

Geometric rigidity in variable domains and applications in dimension reduction

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Alle Interessierten sind herzlich eingeladen.

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Abstract:

In this talk we present a quantitative geometric rigidity estimate in dimensions $d = 2, 3$ generalising a celebrated result by Friesecke, James and Müller to the setting of variable domains. Loosely speaking, we show that for each function $y \in H^1(U; \mathbb{R}^3)$ and for each connected component of an open bounded set $U \subset \mathbb{R}^d$, the L^2-distance of ∇y from a single rotation can be controlled up to a constant by its L^2-distance from the group $SO(d)$, with the constant not depending on the precise shape of U, but only on an integral curvature functional related to ∂U. We further show that for linear strains the estimate can be refined, leading to a uniform control independent of the set U. The estimate can be used to establish compactness in the space of generalized special functions of bounded deformation (GSBD) for sequences of displacements related to deformations with uniformly bounded elastic energy. We show how this estimate can be applied in the context of dimension reduction by calculating the Γ-limits for thin elastic solids containing voids in different energy scaling regimes in terms of their thickness. This is seminar based on joint work on with Manuel Friedrich (Johannes Kepler Universität Linz) and Konstantinos Zemas (Universität Bonn).