

Friedrich-Hirzebruch-Kolloquium

# Counterintuitive approximations

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The Nash-Kuiper embedding theorem is a prototypical example of a counterintuitive approximation result: it implies that any surface can be isometrically  $C^2$ -embedded into an arbitrarily small ball in  $\mathbb{R}^3$ . For  $C^2$ -embeddings this is impossible due to curvature obstructions.

We will present a general result which allows for approximations by functions satisfying strongly overdetermined equations on open dense subsets. To illustrate this we construct nonconstant Lipschitz functions whose derivative vanishes on an open dense subset. Furthermore, we find embeddings of surfaces with surprising curvature properties.

Our method is based on the "cut-off homotopy principle", a concept introduced by Gromov in 1986. This is joint work with Bernhard Hanke.

**After the talk there will be a reception at the ground floor of the faculty building, Einsteinstr. 62.**