EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

Mathematisch-Naturwissenschaftliche Fakultät

Fachbereich Mathematik
AB Geometrische Analysis, Differentialgeometrie und Relativitätstheorie

Oberseminar
Geometrische Analysis, Differentialgeometrie und Relativitätstheorie

Am Donnerstag, den **09.07.2026** spricht um **14 Uhr** im Raum **C4H33 und über Zoom**

Dr. Gabriel Sánchez-Pérez,
(University of Salamanca)

über das Thema

Killing and homothetic initial data for general hypersurfaces

In this talk we present a novel framework to address the homothetic Killing initial data problem for general hypersurfaces. Specifically, we present a collection of general identities relating the deformation tensor $\mathscr{L}_\eta g$ of an arbitrary vector field η with the tensor $\mathscr{L}_\eta \nabla$ on an abstract (i.e. viewed as a detached object from the spacetime) hypersurface $\mathscr{H}$ of any causal character. As an application we establish necessary conditions on $\mathscr{H}$ for the existence of a homothetic Killing vector in the spacetime where $\mathscr{H}$ is embedded. Their sufficiency is then analyzed in three specific settings. For spacelike hypersurfaces, we recover the well-known homothetic KID equations [Coll, García-Parrado–Khavkine] in the language of hypersurface data. For two intersecting null hypersurfaces, we generalize a previous result [Chruściel- Paetz] (valid for Killings) to the homothetic case and, moreover, demonstrate that the equations can be formulated solely in terms of the initial data for the characteristic Cauchy problem, i.e., without involving a priori spacetime quantities. This puts the characteristic KID problem on equal footing with the spacelike KID problem. Furthermore, we highlight the versatility of the formalism by addressing the homothetic KID problem for smooth spacelike-characteristic initial data. Other initial value problems, such as the spacelike-characteristic with corners, can be approached similarly. This talk is based on arXiv:2502.07767 and in Chapters 3 and 4 of arXiv:2604.19668.

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Hierzu wird herzlich eingeladen.
Carla Cederbaum, Gerhard Huisken, zusammen mit Jan Metzger (Potsdam)