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Advanced modelling approaches for continua with microstructure

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In the last decades, several advanced approaches for continuum modelling have emerged which can be used to study the impact of the microstructure on the physical behaviour of materials. This includes, for example, the Virtual Element Method in the context of computational homogenisation, developed for investigations of crystalline microstructures. A different approach, compared to such multiscale methods, is generalised continua which consider size effects stemming from the microstructure, for example, via higher-gradient contributions. In this regard, the Isogeometric Analysis is a suitable simulation method due to the high continuity of the underlying basis functions. Further modern approaches used to study continua with microstructure are meshless methods, machine-learning techniques, or partial domain decomposition, for example, Global-Local approaches, to name only a few. The minisymposium addresses topics related to the theoretical background of advanced modelling approaches as well as contributions in the context of material modelling with microstructural considerations. Topics include, but are not restricted to:

- Theoretical advances in modern modelling approaches, e.g., the Virtual Element Method, Isogeometric Analysis, Domain Decomposition
- Machine Learning techniques to microstructures, i.e., Model-Data-Driven and pure Data-Driven approaches
- Multiscale approaches and computational homogenisation
- Generalised continuum approaches
- Applications to coupled problems, composite materials, etc.

This minisymposium aims to provide a platform for researchers of the GACM community to present, exchange and discuss ideas and recent developments in this field. Due to the multidisciplinary nature, it includes works from mathematics and engineering points of view and welcomes contributions from theoretical, computational, and applied perspectives.