

GCCE Seminar: **Covariant, contravariant, irrelevant?**

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13th January 2023, 10:00 – 11.30
at Inffeldgasse 23, 8010 Graz ,first floor, HSi10

Vector and tensor fields may display various transformation behaviours upon changing the coordinate system – besides transforming covariant or contravariant, the transformation may also involve the determinant of the (local) coordinate transformation matrix. Though for several objects of field theories some transformation behaviours seem natural (e.g. the Green-Lagrange-strain tensor is usually considered purely covariant), in some cases, these characteristics of tensorial objects seem rather arbitrary (e.g. stress tensors and deformation rates in fluid dynamics). Sometimes, it suffices to be consistent in the choice of index variance, but in other cases, the choice of distinct transformation behaviours may lead to different physical predictions.

In the current lecture we shall explain how the different transformation behaviours come into being and why conjugate objects (e.g. stress and strain) need to transform opposite to each other. We furthermore discuss when and why these transformation behaviours matter, whether physical (tensor) fields have a 'natural' index variance and how this may be inferred from the physical meaning of a tensorial object.

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All the interested are kindly invited and we hope to see you there.