INVARIANTS IN SCALAR-TENSOR THEORIES OF GRAVITY

Ott Vilson, Laur Järv, Piret Kuusk, Mihkel Rünkla, Margus Saal

Institute of Physics, University of Tartu, W. Ostwaldi 1, 50411 Tartu, Estonia
e-mail: ovilson@ut.ee

The aim of the talk is to give an overview of the scalar-tensor theories of gravity and invariants therein. First, I will shortly introduce the main concepts of general relativity and the mathematical apparatus that is used. Second, I will motivate the necessity for modifying general relativity and introduce Weyl's idea for extending the underlying symmetry group by including the possibility to locally rescale the lengths of vectors, i.e. essentially the prescription for calculating the inner product (dot product) is modified in a space-time point dependent manner by making use of a scalar field [1]. From the viewpoint of Weyl's idea, a scalar-tensor theory of gravity is a natural modification of the general relativity. However, if we consider Weyl's rescaling as a symmetry, then observables should be given via quantities that are invariant under such a transformation. Hence, as the third part of the talk, I will introduce these invariants and outline the prescription for constructing these objects [2]-[4].

References

1. H.Weyl, 1918, *Sitzungsber. Akad. Wiss. Berlin*, 465-80.
2. L.Järv, P.Kuusk, M.Saal, O.Vilson, 2014, *J. Phys. Conf. Ser.,* 532, 012011.
3. L.Järv, P.Kuusk, M.Saal, O.Vilson, 2015, *Phys. Rev.* D, 912, 024041.
4. O.Vilson, 2015, arXiv.org/abs/1509.02481 (to appear in *Advances in Applied Clifford Algebras*).

Euroopa Liit
Euroopa
Regionaalarengu Fond

Eesti
tuleviku heaks