Structured Relativistic Continuum. Spherically Symmetric Solutions

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ABSTRACT

It is well known that there are various models of gravitation: the metrical Hilbert-Einstein theory, a wide class of intrinsically Lorentz-invariant tetrad theories (of course, generally-covariant in the space-time sense), and many gauge models based on various internal symmetry groups (Lorentz, Poincare, GL(n;R), SU(2;2), GL(4;C), and so on). It is an interesting idea to develop the class of GL(4;R)-invariant (or rather GL(n;R)-invariant) tetrad (n-leg) generally covariant models. Formally the obtained scheme is a generally-covariant tetrad (n-leg) model, but it turns out that generally-covariant and intrinsically affinely-invariant models must have a kind of non-accidental Born-Infeld-like structure. It is interesting that they possess some group-theoretical solutions and more general spherically-symmetric solutions. It is also interesting that within such framework the normal-hyperbolic signature of the space-time metric is not introduced by hand, but appears as a kind of solution, rather integration constants, of differential equations. Let us mention that our Born-Infeld scheme is more general than alternative tetrad models. It may be also used within more general schemes, including also the gauge ones.