

Dynamics of flat anisotropic models in Lovelock gravity

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Poster is based on the papers:

S. A. Pavluchenko, *General features of Bianchi-I cosmological models in Lovelock gravity*, Phys. Rev. **D80**, 107501 (2009) // arXiv:0906.0141

I.V. Kirnos, S.A. Pavluchenko, and A.V. Toporensky, *New features of flat (4+1)-dimensional cosmological model with a perfect fluid in Gauss-Bonnet gravity*, Grav. Cosmol. (accepted) // arXiv:1002.4488

S.A. Pavluchenko, *Dynamics of flat anisotropic models in Lovelock gravity: The even-dimensional case*, arXiv:1003.4892

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Summary of the results

The Lagrangian and the equations of motion for flat anisotropic cosmological models in Einstein-Lovelock gravity are derived in arbitrary number of spatial dimensions and for any possible Lovelock correction taken into account. Power-law *ansatz* approach allows us to obtain the conditions for generalized Kasner and Milne regimes; that conditions depends only on the order of the Lovelock contribution. In the case with the matter in form of a perfect fluid, the condition that separates the matter- and Lovelock-dominated regimes is obtained; it also depends only on the order of the Lovelock contribution.

The (4+1)-dimensional vacuum model is investigated numerically; the results allow to conclude that all models in Einstein-Lovelock gravity with even number of spatial dimensions are pathological with regard to the absence of a "standard singularity-to-standard expansion" transition.

The (4+1)-dimensional model with matter source in form of a perfect fluid is free from the above-mentioned pathology, but the measure of the "standard singularity-to-standard expansion" decreases with growth of density. Also, the "standard singularity-to-isotropic expansion" transition is density-limited. In higher even number of spatial dimensions we expect further decrease of the measure of "standard singularity-to-standard expansion" transitions.

Addition of matter nearly "erased the boundaries" between different initially vacuum transitions, leaving only two patterns for transition changing -- one for negative and one for positive triads.