SCALAR FIELD COSMOLOGY

Sergey V Chervon

Ulyanovsk State Pedagogical University, Russia

Seminar 1: A canonical scalar field in GR cosmology

It will be considered the basic equations in scalar field GR cosmology with application to exact inflationary cosmology. It will be presented the methods of exact solutions' construction, such as fine tuning of the potential, solution construction from a scalar field evolution, the method of generating function.

Seminar 2: The superpotential method in GR and Brane cosmology

Slow-roll approximations' parameters will be considered as an effective approach in inflationary cosmology. It will be described the superpotential method which can transform slow-roll approximated solutions to exact ones. Generalization of the superpotential method to chiral cosmological model and for Brane cosmology will be discussed.

Seminar 3: Cosmological solutions in modified gravity theories

The generalized scalar tensor gravity, Einstein-Gauss-Bonnet gravity and Gravity with higher derivative of Ricci scalar will be under consideration. The methods of generating new exact cosmological solutions in modified gravity theories from GR solutions will be presented. The method of investigation of cosmological parameters for modified gravity theories will be discussed.

References:

1. S. Chervon, I. Fomin, V. Yurov, A. Yurov, SCALAR FIELD COSMOLOGY, Series on the Foundations of Natural Sciences and Technology – Vol. 13. Monography. World Scientific Publishing, 264 P, 2019.
2. I.V. Fomin, S.V. Chervon, Reconstruction of GR cosmological solutions in modified gravity theories. Phys.Rev. D100, no.2, 023511, 2019.
3. S.V. Chervon, I.V. Fomin, E.O. Pozdeeva, M. Sami, S.Yu. Vernov Superpotential method for chiral cosmological models connected with modified gravity (Co-authors:). Phys.Rev. D100, no.6, 063522, 20 pp., 2019.
4. S.V. Chervon, I.V. Fomin, T.I. Mayorova Cosmological Model of f(R) Gravity with a Kinetic Curvature, Grav.Cosmol. 25, no.3, 205-212, 8 pp.,2019.