



“About the Applicability of CANM to Some Nonlinear Eigenvalue Problems Arising from the Astrophysics and the Black-Holes Theory”

**Friday, May 2, 2:30 pm
Pickard Hall, Room 304**

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Abstract:

We investigate numerically class of models of static spherically symmetric mixed stars in the scalar-tensor theory of gravity with massive dilaton field. The proper mathematical model of such stars is interpreted as a nonlinear one- or two-parametric eigenvalue problem with free boundaries in respect to metric functions, the functions describing the fermionic and bosonic matter, the dilaton field, etc. Similar approach for study static and spherically symmetric charged and neutral black-hole solutions coupled to both Euler-Heisenberg and Born-Infeld types nonlinear electrodynamics in scalar-tensor theories of gravity with massive dilaton is implemented also. The Continuous Analogue of Newton Method (CANM) in multiparametric space to solve these problems is used.

An information about the basic geometric functions and the functions describing the matter fields, which build the star is obtained. The numerical solutions show that the structure and properties of the stars in presence of massive dilaton field essentially depend on its fermionic and bosonic components. The dilaton potentials allow many more black-hole causal structures than the massless dilaton, the reason for which is the presence of the scalar field. We find that depending on the black-hole mass and charge, and the dilaton mass the black holes can have either one, two, or three horizons.

The Math Department will provide refreshments 30 min. prior to the presentation.

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