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## INVITED SPEAKERS

### Spectral indefinite problems of hydrodynamics

Thomas Azizov, *Voronezh, Russia*

Nikolay Kopachevsky, *Simferopol, Ukraine*

This paper deals with the conservative and dissipative dynamical systems with infinite degrees of freedom that encountered in evolution problems of linear hydrodynamics, and corresponding spectral problems.

A common feature of the investigated spectral problems is a potential energy operator of the system with alternating signs. Because of that we use spaces with an indefinite metric (space of M. Krein and space of L. Pontryagin, see [1-6]), which allows us to prove the propositions on solvability of the considered problems, to study their spectral properties and to get conditions of dynamic stability (instability) of the investigated dynamic systems.

Using this approach we study some actual problems of fluid mechanics: the problems of the eigen-oscillations of a body with a cavity that is completely filled with an ideal or viscoelastic fluid, the problem of eigen-oscillations of a stratified fluid in a cylindrical container, the problem of S. Krein (on the normal oscillations of a heavy viscous fluid in an open vessel), the problem of the transverse vibrations of a viscoelastic rod with a weight at the end, the problem of the movements of the articulated gyrostats, etc.

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- [4] L. S. Pontryagin, *Hermitian Operators in Spaces with Indefinite Metric*, News of AS of USSR, Ser. Math., 8 (1982), no. 6, 243–280. (in Russian).
- [5] I. Tz. Gohberg, M. G. Krein, *Introduction to the Theory of Linear Non-Selfadjoint Operators*, Nauka, Moscow, 1965 (in Russian).
- [6] N. D. Kopachevsky, S. G. Krein, Ngo Zuy Kan, *Operator Methods in Linear Hydrodynamics: Evolution and Spectral Problems*, Nauka, Moscow, 1989 (in Russian).

### Invariant curves of rational functions

Alexandre Eremenko, *West Lafayette, Indiana, USA*

We consider Jordan analytic curves on the Riemann sphere which are invariant under a rational function. The study of such curves was suggested by Fatou.