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BOOK OF ABSTRACTS

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INDEFINITE SPECTRAL HYDRODYNAMIC PROBLEMS

T. YA. AZIZOV[1], N. D. KOPACHEVSKY[2]
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We study conservative and dissipative dynamical systems with infinite degrees
dom that arise in evolution problems of linear hydrodynamics, and corresponding s
problems.

In this problems the system motion near its equilibrium state is described by fu
with values in a Hilbert space $\mathcal{H}$. Typically, the operator of the kinetic energy
system is positive and bounded or compact in $\mathcal{H}$, and the operator of the potential
of the system is self-adjoint and bounded from below in $\mathcal{H}$.

Because of the latter circumstances we use the functional spaces with an ind
metric (space of M. Krein and space of L. Pontryagin, see [1-6]). This approach all
to study the considered problems, in particular, to prove the propositions on solv
of them, to investigate their spectral properties and to get conditions of dynamic s
or instability of the considered dynamical systems.

Using this approach we consider some spectral problems that are generated by
problems of fluid mechanics [7-10]. Namely, the problems of the eigen-oscillation
body with a cavity that is completely filled with an ideal fluid, the problem o
oscillations of a stratified fluid in a cylindrical container, the problem of S. Kre
the normal oscillations of a heavy viscous fluid in an open vessel), the problem
transverse vibrations of a viscoelastic rod with a weight at the end, the problem
movements of the articulated gyrostats, the problem of small motion of a visco
fluid, and the transmission problems are studied.

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ELLIPTIC PROBLEMS WITH HARDY POTENTIALS

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In this talk we discuss problems of the type

$$\Delta u + \frac{\mu}{\delta^2(x)} u = u^p$$

.. a bounded smooth domain $\Omega \subset \mathbb{R}^n$. Here $\delta(x)$ is the distance of a point $x \in \Omega$ to ... boundary. We are interested in the existence and the boundary behavior of positive ...utions. The existence depends heavily on the value of μ. Because of the singularity the ...ution cannot be described arbitrarily on the boundary. In this context the solutions of ... linear problem $\Delta h + \frac{\mu}{\delta^2(x)} h = 0$ play an essential role. The case $p > 1$ was studied in ... and the case $0 < p < 1$ is a common project in progress with M.A. Pozio.

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