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Abstracts of Short Communications and Posters

Section:

12. Probability and Statistics

1991 MS Classification: 35, 76, 85, 86
Rieutord, Michel, Observatoire Midi-Pyrénées, Toulouse, France
A boundary value problem of mixed type in a spherical shell
We are interested in solving an eigenvalue problem controlling the perturbations of a rotating stratified fluid. This yields an ill-posed problem in the sense of Hadamard since the resulting partial differential equations is of mixed type and meets oblique derivative boundary conditions on the spheres encompassing the fluid's volume. In addition the variables are not separable. Classifying the trajectories of characteristics and evaluating the associated Lyapunov exponent, we can determine the nature of the spectrum of the associated operator and show that the point spectrum is in a fractal set itself in $[0, \sqrt{1+N^2}]$, where N is measuring the stratification. If N is zero, the equation reduces to the well-known Poincaré equation which point spectrum is shown to contain only the eigenvalues $\{1/(m+1), m \in \mathbb{N}\}$.
Reference : Rieutord M. and Valdettaro L., Inertial waves in a rotating spherical shell, *J. Fluid Mech.* **341** (1997), 77–99.