

**Burde, Georgy I.; Zhaliy, Alexander**

**Separable non-parallel and unsteady flow stability problems.** (English) [Zbl 1288.76027](#)

Mladenov, Ivailo M. (ed.) et al., Proceedings of the 5th international conference on geometry, integrability and quantization, Sts. Constantine and Elena (near Varna), Bulgaria, June 5–12, 2003. Sofia: Bulgarian Academy of Sciences (ISBN 954-84952-8-7/pbk). 131-143 (2004).

Summary: The governing equations of the hydrodynamic stability theory are separable only with the parallel steady-state flow assumption, when they can be reduced to an ordinary differential equation, the Orr-Sommerfeld equation. For nonparallel flows, a basic flow and the equations for disturbance flow are dependent on the downstream coordinate so that the corresponding operator does not separate unless certain terms are ignored. If the basic flow is non-steady, this brings about great difficulties in theoretical studies of the instability since the normal modes containing an exponential time factor  $\exp t$  are not applicable here. The objective of this work was to obtain new results in the problem of linear stability of non-parallel and unsteady flows by applying the recently developed symmetry-based approach to the separation of variables in PDEs with variable coefficients.

For the entire collection see [\[Zbl 1048.53002\]](#).

**MSC:**

**76E09** Stability and instability of nonparallel flows in hydrodynamic stability

**Full Text:** [EMIS](#)