

APPLICATION OF THE BOGOLYUBOV'S  
NONLINEAR TRANSFORMATION METHOD  
IN THE PROBLEM OF HYDRODYNAMICS

*O. B. Lykova, S. A. Nakonechna<sup>1</sup>, A. S. Zhokhin<sup>1</sup>*

Institute of Mathematics, Nat. Acad. Sci. of Ukraine  
(3, Tereshchenkivska Str., Kyiv 01004, Ukraine),

<sup>1</sup>Bogolyubov Institute for Theoretical Physics,  
Nat. Acad. Sci. of Ukraine  
(14b, Metrolohichna Str., Kyiv 03143, Ukraine)

S u m m a r y

Stability of the Gachok system's equilibrium state is shown by the Bogolyubov nonlinear transformations with help of central manifolds. A phase portrait is found which qualitatively shows the existence of hydrodynamic chaos in a flow fluid system of the Zaltzman model. The method can be also applied to complex dynamic systems of higher order.