Oscillating loss of stability of trivial solution for boundary-value problem with linear deviate in boundary condition

Ivanovsky Leonid, Kuksenok Ilya

[leon19unknown@gmail.com](mailto:leon19unknown@gmail.com), [kuksenok.i.s@ya.ru](mailto:kuksenok.i.s@ya.ru)

Scientific supervisor: Prof. Dr. Kaschenko S.A., Department of Computer Modelling, Faculty of Mathematics, P.G. Demidov Yaroslavl State University, Department of Applied Mathematics, Institute of Intelligent Cybernetic Systems, National Research Nuclear University Moscow Engineering Physics Institute

Let us consider nonlinear boundary-value problem with linear deviate in boundary condition

(1)

(2)

Parameters , , , and in zero smooth function has at least the second infinitesimal order.

To research the stability of trivial solution of problem (1), (2), it’s necessary to find the eigenvalue with vanishing real part on the left side, i.e. the greatest among the rest. When all eigenvalues are in the left part of complex plane and one pair of them are on imaginary axis, there is an oscillating loss of stability of zero balance state. Our task was to find critical values of initial parameters, when there is the stability loss of trivial solution of problem (1), (2).

The research was carried out by means of special software. All calculations were performed on a large number of independent streams of CPU.

As a result of numerical research there were found some critical values of initial parameters, when zero balance state of problem (1), (2) is collapsing vibrationally.

This work was supported by the Russian Science Foundation (project nos. №14-21-00158).

**References**

1. Kaschenko S.A. About bifurcations with small disturbances in logistic equation with delay // Modelling and Analysis of Information Systems, v.24, №2, p. 168 – 185 (2017).
2. Ivanovsky L.I., Kaschenko S.A. Stability loss of the trivial solution of boundary-value problem with linear deviate in boundary conditions // International Scientific Conference “New trends in nonlinear dynamics”. Abstracts, p. 32-33 (2017).