Optimization in nonlinear models of economic dynamics

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We consider nonlinear models of economic dynamics on the basis of the ordinary differential equations. The nonlinear effects shown in real systems and in models are discussed. We analyze the possibilities of the quantitative analysis of before crisis and crisis conditions of economic systems. Search of system's parameters optimum from the point of view extra crisis development is investigated.

In economic and social systems the analysis precritical and a crisis state of system is much more difficult, than in natural sciences. Such conditions in economy can be investigated and predicted by means of application of methods of synergetic, use of essentially nonlinear dynamic models of foreseeable dimension.

In the conditions of an economic crisis real macroeconomic indicators show the properties inherent in decisions of nonlinear dynamic models – oscillations about a trend, precritical oscillation's strengthening, loss of stability of a trend as crisis display, economy transition in a new steady condition as bifurcation, origin of a new steady condition, the further development of it a condition as an overcoming the crisis.

Statement one and multicriteria problems of economic system's optimization taking into account achievement of the best economic indicators and risk minimization is considered. The risk parameters join possibility of transition to a crisis state. We consider the expediency use of multicriteria analysis [1] for search the compromise solutions in problems with contradictory criteria not only in engineering problems, but also in multicriteria problems of optimization of economic and social systems.

Results of numerical experiments under the analysis of nonlinear effects in models of economic dynamics are discussed.

References

[1] Statnikov R.B. and Matusov J.B. Multicriteria Analysis in Engineering. Dordrecht/ Boston / London: Kluwer Academic Publishers, 2002