MATHEMATICAL MODELING OF ECONOMIC PROCESSES BASED ON FINITE DIFFERENCE MODELS

CONFERENCE PRESENTATION

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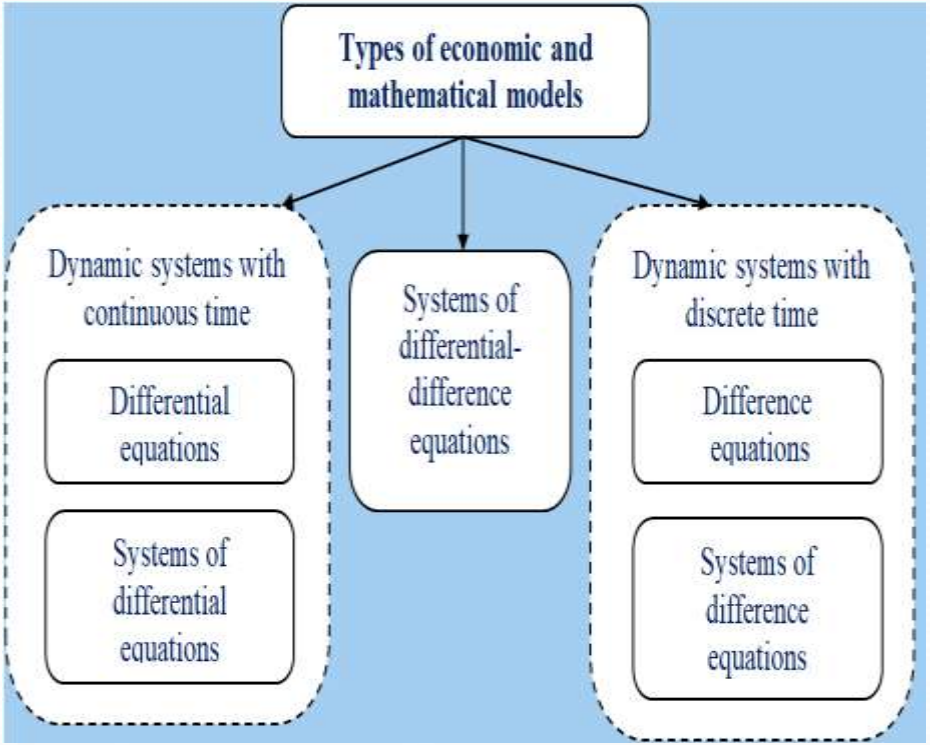
The purpose of the work

It is the analysis of mathematical models of economic dynamics, which are described by finite difference equations and systems of difference equations. Traditional linear models of problems of this type are the cobweb model of the market and Samuelson-Hicks economic development model, which describes the growth of national income. Nonlinear models are used to investigate long-term trends and factors of economic development (transformation) such as Blanchard-Watson model, Goodwin model, Solow models, Sargent-Tarnovsky model, Arrow-Debray model of price regulation, Phillips economic cycle model, Kaldor economic cycle model, the market model with inventories, the market model with delayed sales, etc.

Analysis methods

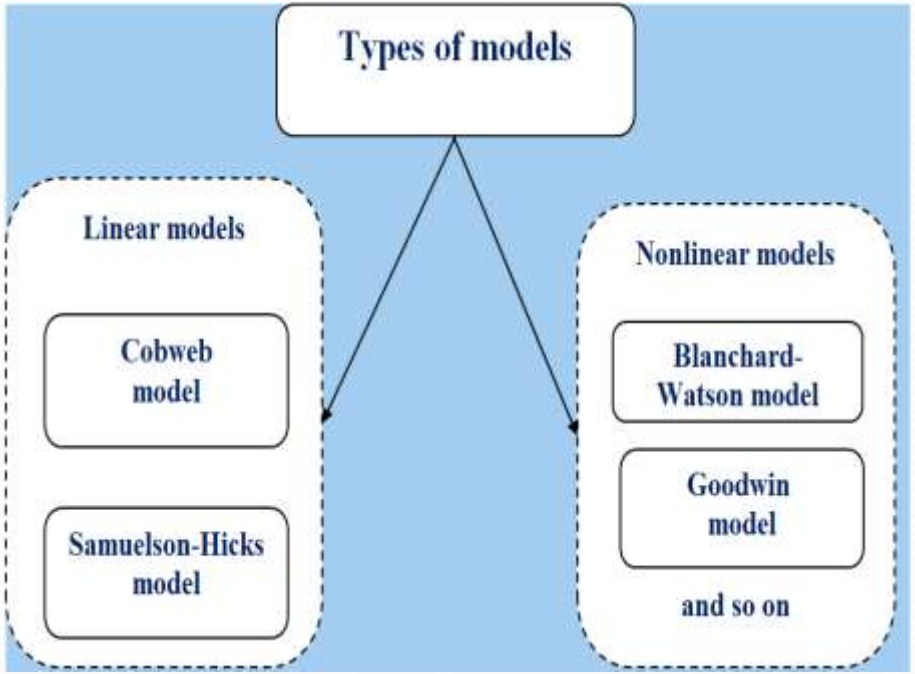
Depending on the type of system dynamics under the investigation, dynamic models can be divided into discrete and continuous. In addition, in some cases, systems with mixed dynamics can be applied. In this case, differential-difference equations are used to describe them. It is known discrete models are divided into linear and non-linear.



Analysis methods

Discrete models are divided into linear and non-linear.

The differences between linear and non-linear models are significant not only from a mathematical point of view, but also from a theoretical and economic point of view, because many dependencies in the economy are fundamentally non-linear in nature.



Conclusions

On the basis of the cobweb model, it is shown that with large deviations from equilibrium, the linear dependence of supply and demand on the price is not realized. According to the second model, the Hicks difference equation is solved. It was established that its solution is unstable and has an oscillatory character. That is, even with a constant rate of capital investment, the economy is unstable and periods of growth alternate with periods of recession. The research of the different types of nonlinear models were investigated.

Future research work

Modeling of economic dynamics using the methods of the theory of dynamical systems in combination with methods of statistical analysis and econometric modeling has the main perspectives in a prediction and a management of economic processes. In the future investigations, such models should be allowed to manage the economy without an obtaining the values of parameters where any crisis values are possible. Further research of linear and nonlinear models consists in modeling the description of various chaotic phenomena in economic dynamics.

Thank you for your attention!

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