Models of economical process based on econophysics laws

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Econophysics is a science at the edge of economics and physics, it studies economic processes based on the use of fundamental laws of nature and physical theories. The use of econophysics allows to improve the research of economic processes.

The purpose of the research is to examine the application of basic physical models for building a macroeconomic model of Ukraine, which will allow making certain short-term forecasts for decision-making at the macro level.

As a result of applying econophysics basis, the macroeconomic model of the Ukrainian economy was constructed as a system of nonlinear differential equations. The entire population of Ukraine is divided into 7 main groups: population itself, workers of industrial enterprises, state employees, employees of the sphere of services, employees of raw materials enterprises, owners of enterprises, elites. The distribution function of accumulation and income, demand function for essential goods and long-term goods are used. The equations for the accumulation of groups represent the balance of incomes and expenses for each group, the price of the product is determined from the balance of demand and supply on the market, the offer is the sum of imported and manufactured products within the country.

The stability of the system under Lyapunov, stationary states of the system was investigated. It is shown that the loss of stability of the solution of the system can be in the range of values close to the minimum purchasing power (bifurcation point).

In accordance with the economic situation in Ukraine, the parameters of the system of differential equations, which describes the macroeconomic model of Ukraine, are selected.