Department of Mathematical Game Theory and Statistical Decisions

Faculty of Applied Mathematics and Control Process

Saint Petersburg State University

Review of Master's thesis

Title: Analysis and control of macroeconomic trends based on the Leontief model

Student: Wang Dan

Reviewer: Nikolay V. Smirnov

The main tasks of this Master's thesis are:

1. Development of a static and dynamic input-output models based on China's input-output table released by The Organisation for Economic Co-operation and Development (OECD) from 2000 to 2018;
2. Construction of algorithm for predicting the development of sectors of the economy and GDP
3. Development of algorithms for macro economic trends control based on controlled dynamic input-output models.

Wang Dan consistently and successfully implemented the research plan. First of all, she studied the structure of the OECD international database and, based on real data, solved the problem of identifying the macroeconomic parameters of the Chinese economy. The most important of these is the capital density. Special efforts had to be made to evaluate it. The principles of constructing dynamic input-output models were also studied. Their implementation allowed the author to obtain a system of ordinary differential equations describing the dynamics of the country's economy. Based on the developed algorithms, a computer program was created. Numerical experiments were carried out using this program. The main result of the work is the possibility to predict the dynamics of GDP.

In the final sections of the thesis, some problems of program control and optimal control are solved. The modeling results are illustrated with real data from the Chinese and USA economies.

Wang Dan participated in The LIII annual international conference Control Processes and Stability (CPS'22), where presented the results of research and prepared an article for publication.

I appreciate the results of this study. My ECTS assessment — A.

N.V. Smirnov, professor,
Department of Modeling of Economical Systems

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