

TURNPIKE SOLUTION IN MEDICAL-ECOLOGICAL-ECONOMIC PROBLEMS ON THE EXAMPLE OF ULAN BATOR CITY¹

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Applying mathematical modeling for studying economic, environmental factors and morbidity is an important step in the system analysis of the social development problems. Estimation and forecasting of medical-ecological-economic state of a region is actual and important task which helps to solve problems of life quality and sustainable development. Creating dynamic mathematical models of medical-ecological-economic systems and multivariate calculations let us to analyze the influence of various factors on the development prospects of the region. Similar studies were conducted for the medical-ecological-economic model of enterprises in the city. [1] At present the development of mathematical models to assess and predict medical-ecological-economic state of Ulan Bator is carrying out.

The next step in applying medical-ecological-economic models is formulating optimal control problems. In this study solutions of optimal control problems are found in the form of the magistrals (turnpikes) [2]. Turnpike solution determines the optimal trajectory, which does not depend directly on the boundary conditions. In order to obtain a solution satisfying the given initial and final conditions turnpike solution is approximated, for example, by a sequence of linear functions in times of entry and exit from the magistral. To find the turnpike solutions method of multiple maxima [3] is used.

In order to carry out the search procedure of turnpike solution we have to formulate criterion of optimality, the restrictions on the model variables and introduce additional assumptions for some elements of the model (eg, dynamics of some variables represent as exogenous functions of time). For such medical-ecological-economic optimal control problems we consider various criterions of optimality.

REFERENCES

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