MATHEMATICAL MODELING ECONOMIC GROWTH WITHIN THE FRAMEWORK OF SOLOW MODEL

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Study of economic growth is an important problem. Classical economists, such as Adam Smith (1776), David Ricardo (1817), and Thomas Malthus (1798), and, much later, Frank Ramsey (1928), Allyn Young (1928), Frank Knight (1944), and Joseph Schumpeter (1934), provided many of the basic ingredients in modern theories of economic growth.

Stylized facts of economic growth are

- output per worker shows continuing growth "with no tendency for a falling rate of growth of productivity";
- capital per worker shows continuing growth;
- the rate of return on capital is steady;
- the capital-output ratio is steady;
- labor and capital receive constant shares of total income.

One of the most famous growth models is Solow model. In this model, part of each instant's output ($Y(t)$) is consumed and the rest is saved and invested. The fraction of output saved is a constant s, so that the rate of saving is $sY(t)$. The community stock of capital $K(t)$ takes the form of an accumulation of the composite commodity. Net investment is then just the rate of increase of the capital stock dK/dt. Depreciation of stock of capital is proportional to capital (qK).

Output is to be understood as net output after making good the depreciation of capital. That why, output is produced with the help of two factors of production, capital and labor, whose rate of input is $L(t)$. As a result of exogenous population growth the labor force increases at a constant relative rate n, Harrod's natural rate of growth. So we have the basic identity at avery instant of time

$$\dot{K} = sF(K, L) - qK \qquad (1)$$

Many different methods have to implement this model. The unknown functions of the output have been specified as decomposition of a trajectory of movement on trend and periodic, the unknown constant factors of decomposition in model have been estimated with help of econometrics' methods. The model has been adjusted on optimum parameters with help of multicriterion regulator. The model approbation have been realized on statistics data of the real macroeconomic systems.

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