ABSTRACT

Master's Thesis Grades 107 pp., 26 Tables, 51 Figs. and 32 sources.

Object of study: The law of evolutionary development of technologies and innovation processes.

Research subject: Analysis of the S-curve of development as a tool for describing and forecasting the development of technical systems and changes of technologies.

The paper deals with the application of S-shaped curves in the context of solving inventive problems, innovations and technologies and their forecasts. After explaining the origin of the logistic S-curve, a brief overview of the publications is given and examples from various fields of application are given. A technique for identifying the parameters of S-curves based on given historical data based on the nonlinear OLS method (using the Desmos graphing calculator and the Minitab 19 statistical analysis package) was developed. On the basis of this technique, the problem of choosing the best S-curve among those selected for use according to the statistical estimates obtained is solved. Next, we build local forecasts for the series under consideration by the example of the Bass diffusion model. The forecast is built in monitoring mode, which allows us to forecast the series under investigation by several steps. Despite the great criticism and difficulty of using S-curves for long-term forecasting, it continues to be a popular model for describing the evolution of systems (technological, economic, social, and others) over time.

SYSTEM EVOLUTION, INNOVATION, TECHNOLOGY, S-CURVE SAMPLES, PARAMETER IDENTIFICATION, LOCAL FORECASTS, BAAS DIFFUSION MODEL