

Thesis abstract. Applications of Linear algebra in Finance and Economics.

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Linear algebra has a large number of applications in the real world financial context. This sort of applications is used for forecasting, asset pricing, socio-economic scenario design, risk management, banking and optimization the processes. Linear algebra elements can be useful here for an analysis as well as for an interpretation the results.

The suggested thesis studied Matrices, Systems of linear equations, Systems of linear inequalities, and Vectors, and demonstrated the specified usage of them in Finance and Economics. The first chapter illustrated the solving several economic problems using matrix algebra followed after learning basic concepts of matrices; operations on matrices; eigenvalues and eigenvectors of a matrix; matrix rank; inverse matrix concept; determinants of a matrix of the second and third orders. It helps us to answer the following questions: How much labor resources the industry consumes, and how much water resources the construction does? What are the all costs of material by type and the price annual stock of material for each company? What is the total cost of raw material?

The second chapter started with the concepts and definitions of linear equations. Three methods for solving systems of linear algebraic equations (inverse matrix method, Cramer's rule, Gauss method) are suggested. Linear algebraic equations and their solution methods play a significant role in most applied fields, including econometrics and linear programming.

Two cases in fields of banking and small-sized business: what are the conditions that must be taken into account when drawing up a production plan for parts A and B? And how much ice cream of each type should be produced by the company in order to maximize the income from the sale of products? Those type of questions can be answered and solved by the system of linear inequalities, which were shown in the third chapter.

A wide range of socio-economic problems requires the above mentioned mathematical methods. Linear algebra gives the opportunity to use theoretical achievements in practice, to implement core knowledge and to resist new conceptual needs. The results obtained with the help of linear algebra make it possible to confirm or refute a hypothesis, build a forecast, and draw up an optimal plan for the functioning of a practically operating object.