Flavia-Corina MITROI-SYMEONIDIS
Eleutherius SYMEONIDIS

LINEAR ALGEBRA for Economists

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editura@ase.ro

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I. Symeonidis, Eleutherius

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Autorii noștri își asumă întreaga responsabilitate pentru ideile exprimate, pentru originalitatea materialului şi pentru sursele bibliografice menţionate.

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Preface

The concepts and techniques of linear algebra are nowadays widely used in every field of economics. Our book provides a concise introduction to basic topics of linear algebra, being designed to provide many detailed examples, solved exercises, in a natural connection of its chapters, with emphasis on vector spaces and linear operators. It covers the topics of the one-term undergraduate Linear Algebra course at the *Bucharest University of Economic Studies*. In terms of prerequisites, the book assumes a basic background on topics like sets, functions, matrices and determinants (we recommend on those subjects the books [9], [19], [28]).

In Chapter 1 we introduce the vector spaces and their properties, we list several examples and counterexamples, followed by notions like linear independence, bases, spanning sets in the framework of finite dimensional vector spaces. We only consider real and complex vector spaces.

Linear operators are introduced in Chapter 2, with the associated fundamental spaces. The diagonalization of endomorphisms, the algorithm to determine the Jordan Canonical Form of a representation matrix are the goal of the second chapter, which ends with applications to ODE systems.

In Chapter 3 we present the linear, bilinear, sesquilinear functionals. The related quadratic forms are introduced together with two methods to diagonalize them: the Jacobi method (leading principal minors) and the Gauss method (completion of squares). Later, in Chapter 4, in the framework of Euclidean spaces, the orthogonal diagonalization of quadratic forms is presented using the Gram-Schmidt algorithm.

The last chapter deals with linear operators on inner product spaces, namely the adjoint, self-adjoint and orthogonal operators.

This book contains a large number of exercises. The solutions of the exercises are often provided, or we indicate how to solve them. A few are left to the reader: have fun!

The authors

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