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MATHEMATICAL THEORY OF ECONOMIC DYNAMICS AND EQUILIBRIA

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This book is devoted to the mathematical analysis of models of economic dynamics and equilibria. These models form an important part of mathematical economics.

Models of economic dynamics describe the motion of an economy through time. The basic concept in the study of these models is that of a trajectory, i.e., a sequence of elements of the phase space that describe admissible development of the economy. From all trajectories we select those that are "desirable" i.e., optimal in terms of a certain criterion.

The apparatus of point-set maps is the appropriate tool for the analysis of these models. The topological aspects of these maps, particularly the Kakutani fixed-point theorem, are used to study equilibrium models as well as n-person games. In order to study dynamic models, we use a special class of maps called in this book superlinear maps.

Chapter 1 describes the theory of superlinear maps. Chapters 2—4 are devoted to models of economic dynamics and present a detailed study of the properties of optimal trajectories. These properties are described in terms of theorems on characteristics (on the existence of dual prices) and turnpike theorems (theorems on asymptotic trajectories).

In chapter 5 we state and study a model of economic equilibrium. The basic idea is to establish a theorem about the existence of an equilibrium state for the Arrow-Debreu model and a certain generalization of it.

In chapter 6 the results obtained earlier are applied to a mode of economic-dynamics with explicit consumption. There are studied the asymptotes and characteristics of optimal trajectories of this model, as well as the relationships between these trajectories and the so-called equilibrium trajectories.

Formulae, theorems, propositions and lemmas are each inedxed by three figures. The first two numbers are the section number and the last indicates the number given to formulae, theorem or proposition within the section.

The book through its mathematical treatment, through the utilization of the most recent results in the filed, may be considered as a monography in the mathematical theory of economic, dynamic and equilibrium models.

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