assessment of their relative importance. Secondly, there is the problem of the sensitivity of the results for constraints with an uncertain empirical validity. He concludes: 

"... theory may be a useful adjunct in decision-making, 'scientific' planning remains as yet unfeasible as the gap between theory and practice has yet to be bridged".

This rather negative opinion by a French planner is in a sense supported by Burmeister's theoretically based results. He warns against the use of: 

"... linearized economic models in a world with inherent non-linearities ... such simple models may not be an appropriate 'approximation', but rather they may be dangerously misleading as to even the qualitative behavior of the correct optimal policies."

The current practice is to build possibly complicated and non-linear descriptive models, to formulate a set of alternative scenarios for the controls and to inspect the time path for the other variables resulting from the model. Without question the choice of scenarios is ad hoc and arbitrary. It reflects the current way of thinking among planners. An optimization experiment can turn up an entirely different scenario. It can also, as pointed out by Aagard—Svendsen and Valstorp—Frederiksen, reveal properties of the descriptive model, presumably more pregnantly than scenario-simulation is able to do. Clearly, there is a role for optimization but its result should not be accepted blind-folded. It could serve as a starting point for the elaboration of actual policy measures.

Absence of well-defined objectives and the high degree of complexity of the macroeconomic environment, escaping adequate description, seem to be natural conditions for the application of fuzzy set theory. Two papers in the volume, namely by Negoita and Adams, propose the use of fuzzy concepts in planning and dynamic modelling, respectively. The first paper is itself too fuzzy, the second one too esoteric to raise interest in this topic above its threshold value with the half-informed layman.

The fact that most papers appear to be remote from actual applicability does not mean that they are without interest to the practitioner. He will not find ready-made solutions to the type of problems he faces, but he may get a sharper picture of what he needs and what can be done. The volume should also be stimulating for those interested in discrete time control theory.

It is somewhat deplorable that the volume contains only the papers and not the discussion. The discussion of a paper can sometimes show its possibilities and limitations, relate it to other work, in general set it against a background.

For students of the paper such comments are usually extremely valuable. Perhaps the heavy editorial burden to collect the contributions to the discussion is the reason why this is omitted. On the other hand it is not clear why three persons are needed to act as editors of the volume reviewed here. Apart from one page of introduction, the value added by their activity is not visible. The abominable English of many contributions has not even been corrected.

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M.C. KEMP and Y. KIMURA
Introduction to Mathematical Economics

As with many scientific disciplines, it is equally difficult to give a generally accepted description of the discipline: Mathematical Economics. Concerning the latter; certainly, the general (Walrasian) equilibrium theory and the optimal growth theory are central themes. Its history goes back to Walras (1874) and Edgeworth (1881), and to Ramsey (1928). The typical models are based on minimal systems of elementary suppositions referring directly to a micro-economic context, in this manner trying to obtain a maximum of scientific robustness. Characteristic problems are the existence of economically consistent price systems, the nature of coalitions, the effect of special market mechanisms, etc. The common mathematical tools are convex analysis, fixed point theory and, for instance, global analysis. As a crucial point in its development we have to mention von Neuman and Morgenstern's book: "Theory of Games and Economic Behavior".

Now, concerning the book of Kemp and Kimura, almost nothing of this is included. As a matter of fact, the book has to be considered as an up-to-date expose about non-negative matrices and the stability of special systems of linear differential equations, appearing in certain economic models.

Chapter 1: "Linear Inequalities" (page 1 to 74), deals with the usual polyhedral separation theorems, with the 'Hawkins—Simon condition' for Leontief
matrices, with linear programming, and with standard
textbook theory from the convex analysis. Special attention is
given to quasi-convex functions. The remaining part
of the book, which appears to be completely indepen-
dent of Chapter 1, is divided as follows. Chapters 2
and 3: "Nonnegative Matrices" and "Some Special
Matrices" (page 74 to 115), present much recent
material about P-, NP-matrices and their variants. In
Chapter 4: "Stability Analysis of Some Dynamic
Systems" (page 115 to 176), some ordinary (linear)
differential equations are studied. Attention is given
to special differential equations appearing in some
'tâtonnement' processes. Finally, the theory of
Chapters 2, 3 and 4 is applied to the economically
oriented Chapters 5 and 6: "Neoclassical Economics –
Statics" and "Neoclassical Economics – Dynamics"
(page 176 to 219).

As suggested before, the book hardly can be taken
as an introduction to mathematical economics. I
think that only with a certain overview in the field
one might appreciate the selection of the topics and
their – sometimes tiring – elaboration. However, as an
exposé about recent developments in this particular
field, Kemp and Kimura's book can be important to
specialists.

Finally, as real introductions to mathematical
economics the books of Debreu: "Theory of Value",
or Hildenbrand and Kirman: "Introduction to Equili-
brium Analysis", or, for instance, Malinvaud: "Lec-
tures on Microeconomics Theory" will do a better
job.

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S.A. Lippman and J.J. McCall (Eds.)

\textit{Studies in the Economics of Search}

North-Holland, Amsterdam, 1979, viii + 225 pages,
US $41.50, Dfl. 85,–.

This book contains a set of essays on the theory of
search. The classical statement of the problem to
which several of the papers revert, is contained in a
paper by G.J. Stigler ("The Economics of Informa-
tion", Journal of Political Economy 69 (1961))
which deals with a consumer searching for the lowest
price. In the problem of job-search an individual is
seeking employment in a market about which he
knows only the distribution function of wages; he
proceeds by randomly applying for positions one at a
time and he has to decide when to terminate the
search. The theory allows both the case of recall in
which the searcher may accept any previous offer and
that of non-recall in which an offer must either be
accepted immediately or lost forever. From one point
of view the theory of search is sequential decision
making under uncertainty, and is amenable to treat-
ment by dynamic programming.

The first introductory chapter summarizes results
for the standard search model and gives excellent
summaries of the nine following chapters. The state-
ment is made that "search theory rather than being a
special topic of economic inquiry is an essential
ingredient of any economic model of individual
behaviour under uncertainty".

R.C. Kormendi (Chapter 4) uses search theory to
model markets. He leaves behind classical models in
which there is perfect information and a 'perfect'
market and asks questions about the nature of price
formation and the exchange process. In classical
development risk aversion does not
influence resource-allocation. Kormendi shows how-
ever that the greater the risk aversion the greater is
the frequency of trade and the higher are the prices
paid and goods flow with higher probability to uses
with higher values.

J.B. Wharton (Chapter 5) examines a model of a
market for labour services which he develops as a
finite-state Markov chain. His model gives a new view
of the processes of market interaction between price
setting, the coming together of buyer and seller and
price adjustment.

In the final chapter on "Unemployment in service
and job search" Kathleen P. Classen analyzes the
effects of unemployment insurance using actual data
for the States of Arizona and Pennsylvania. Unem-
ployment benefit can be used by governments to
modify conditions in the labour market. In models of
job search an increase in the benefits leads to an
increase in the reservation wage, a possible decrease in
the keenness of unemployed persons to seek employ-
ment and an increase in the expected duration of un-
employment. Using a dynamic programming model
Classen examines the data and concludes that this is
so, but her model gives results disagreeing with other
studies that have found that increasing benefits have a
positive effect on wages expected and obtained subse-
quent to unemployment.

Operational researchers will find much to interest
them in this book and will find many ideas of