Iterative Dynamic Programming (Monographs and Surveys in Pure and Applied Mathematics)

By Rein Luus

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Dynamic programming is a powerful method for solving optimization problems, but has a number of drawbacks that limit its use to solving problems of very low dimension. To overcome these limitations, author Rein Luus suggested using it in an iterative fashion. Although this method required vast computer resources, modifications to his original scheme have made the computational procedure feasible.

With iteration, dynamic programming becomes an effective optimization procedure for very high-dimensional optimal control problems and has demonstrated applicability to singular control problems. Recently, iterative dynamic programming (IDP) has been refined to handle inequality state constraints and noncontinuous functions.

Iterative Dynamic Programming offers a comprehensive presentation of this powerful tool. It brings together the results of work carried out by the author and others - previously available only in scattered journal articles - along with the insight that led to its development. The author provides the necessary background, examines the effects of the parameters involved, and clearly illustrates IDP's advantages.

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Review
"This book provides a working knowledge of IDP with many worked out solutions for a wide range of problems. This is especially useful for graduate students and industrial practitioners because a strong background in mathematical techniques and chemical engineering is not essential for understanding this book. This book can be used in a university as a textbook at the level of seniors or first-year graduate students. Of course, this book is also suitable for academic researchers who need an alternative way to cross-validate their solutions to OCPs with their newly devised methods... It can be concluded that this text is a very good addition to the toolbox for numerical optimal control. It is expected that all engineers, graduate students, researchers who are involved in solving optimal control problems should know IDP - the new powerful OCP solution scheme." -International Journal of Robust and Nonlinear Control, vol. 11, no. 14, December 15, 2001

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