

Annals of the
International Society of
Dynamic Games

Vlastimil Krivan
Georges Zaccour
Editors

Advances in Dynamic Games

Theory, Applications, and Numerical
Methods

 Birkhäuser

Vlastimil Krivan • Georges Zaccour
Editors

Advances in Dynamic Games

Theory, Applications, and Numerical
Methods

 Birkhäuser

Editors

Vlastimil Křivan
Biology Centre AS CR
České Budějovice
Czech Republic

Georges Zaccour
GERAD
HEC Montréal
Montreal, QC, Canada

ISBN 978-3-319-02689-3 ISBN 978-3-319-02690-9 (eBook)

DOI 10.1007/978-3-319-02690-9

Springer Cham Heidelberg New York Dordrecht London

Library of Congress Control Number: 2013953331

Mathematics Subject Classification (2010): 49N70, 49N75, 49N90, 91A15, 91A22, 91A23, 91A24, 91A25, 91A80

© Springer International Publishing Switzerland 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.birkhauser-science.com)

Contents

Part I Dynamic Games: Theory and Computation

1	Relative Value Iteration for Stochastic Differential Games	3
	Ari Arapostathis, Vivek S. Borkar, and K. Suresh Kumar	
2	OPTGAME3: A Dynamic Game Solver and an Economic Example	29
	Dmitri Blueschke, Reinhard Neck, and Doris A. Behrens	
3	Dynamic Programming Approach to Aircraft Control in a Windshear	53
	Nikolai D. Botkin and Varvara L. Turova	
4	Existence of Optimal Controls for a Bi-Level Optimal Control Problem	71
	Dean A. Carlson	
5	Static Linear-Quadratic Gaussian Games	85
	Meir Pachter	
6	Interior Convergence Under Payoff Monotone Selections and Proper Equilibrium: Application to Equilibrium Selection	107
	Dai Zusai	

Part II Dynamic Games: Applications

7	Should a Retailer Support a Quality Improvements Strategy?	125
	Pietro De Giovanni	
8	A Large Population Parental Care Game with Asynchronous Moves	149
	David M. Ramsey	

9	Conditions for Cooperation and Trading in Value-Cost Dynamic Games	173
	Jürgen Scheffran	
10	Intra-seasonal Strategies Based on Energy Budgets in a Dynamic Predator–Prey Game	205
	Kateřina Staňková, Alessandro Abate, and Maurice W. Sabelis	
11	On a Game-Theoretic Model of Environmental Pollution Problem ..	223
	Marianna Troeva and Vassili Lukin	
Part III Pursuit-Evasion Games		
12	Open-Loop Solvability Operator in Differential Games with Simple Motions in the Plane	239
	Liudmila Kamneva and Valerii Patsko	
13	Game with Two Pursuers and One Evader: Case of Weak Pursuers	263
	Sergey Kumkov, Valerii Patsko, and Stéphane Le Méneć	
14	Collaborative Interception of Moving Re-locatable Target	295
	Stéphane Le Méneć	
15	The Effect of Pursuer Dynamics on the Value of Linear Pursuit-Evasion Games with Bounded Controls	313
	Josef Shinar, Valery Y. Glizer, and Vladimir Turetsky	