1.	Record Nr.	UNINA9910437907603321
	Autore	Zhang Huaguang
	Titolo	Adaptive Dynamic Programming for Control [[electronic resource]] : Algorithms and Stability / / by Huaguang Zhang, Derong Liu, Yanhong Luo, Ding Wang
	Pubbl/distr/stampa	London : , : Springer London : , : Imprint : Springer, , 2013
	ISBN	1-4471-4757-X
		1-283-93343-8
	Edizione	[1st ed. 2013.]
	Descrizione fisica	1 online resource (431 p.)
	Collana	Communications and Control Engineering, , 0178-5354
	Disciplina	629.836
	Soggetti	Control engineering
		Mathematical optimization
		Artificial intelligence
		Computational intelligence
		System theory
		Control and Systems Theory
		Optimization
		Artificial Intelligence
		Computational Intelligence
		Systems Theory, Control
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Note generali	Description based upon print version of record.
	Nota di bibliografia	Includes bibliographical references and index.
	Nota di contenuto	Optimal Stabilization Control for Discrete-time Systems -- Optimal Tracking Control for Discrete-time Systems -- Optimal Stabilization Control for Nonlinear Systems with Time Delays -- Optimal Tracking Control for Nonlinear Systems with Time-delays -- Optimal Feedback Control for Continuous-time Systems via ADP -- Several Special Optimal Feedback Control Designs Based on ADP -- Zero-sum Games for Discrete-time Systems Based on Model-free ADP -- Nonlinear Games for a Class of Continuous-time Systems Based on ADP -- Other Applications of ADP.
	Sommario/riassunto	There are many methods of stable controller design for nonlinear systems. In seeking to go beyond the minimum requirement of

stability, Adaptive Dynamic Programming for Control approaches the challenging topic of optimal control for nonlinear systems using the tools of adaptive dynamic programming (ADP). The range of systems treated is extensive; affine, switched, singularly perturbed and time-delay nonlinear systems are discussed as are the uses of neural networks and techniques of value and policy iteration. The text features three main aspects of ADP in which the methods proposed for stabilization and for tracking and games benefit from the incorporation of optimal control methods: • infinite-horizon control for which the difficulty of solving partial differential Hamilton–Jacobi–Bellman equations directly is overcome, and proof provided that the iterative value function updating sequence converges to the infimum of all the value functions obtained by admissible control law sequences; • finite-horizon control, implemented in discrete-time nonlinear systems showing the reader how to obtain suboptimal control solutions within a fixed number of control steps and with results more easily applied in real systems than those usually gained from infinte-horizon control; • nonlinear games for which a pair of mixed optimal policies are derived for solving games both when the saddle point does not exist, and, when it does, avoiding the existence conditions of the saddle point. Non-zero-sum games are studied in the context of a single network scheme in which policies are obtained guaranteeing system stability and minimizing the individual performance function yielding a Nash equilibrium. In order to make the coverage suitable for the student as well as for the expert reader, Adaptive Dynamic Programming for Control: • establishes the fundamental theory involved clearly with each chapter devoted to a clearly identifiable control paradigm; • demonstrates convergence proofs of the ADP algorithms to deepen undertstanding of the derivation of stability and convergence with the iterative computational methods used; and • shows how ADP methods can be put to use both in simulation and in real applications. This text will be of considerable interest to researchers interested in optimal control and its applications in operations research, applied mathematics computational intelligence and engineering. Graduate students working in control and operations research will also find the ideas presented here to be a source of powerful methods for furthering their study. The Communications and Control Engineering series reports major technological advances which have potential for great impact in the fields of communication and control. It reflects research in industrial and academic institutions around the world so that the readership can exploit new possibilities as they become available.