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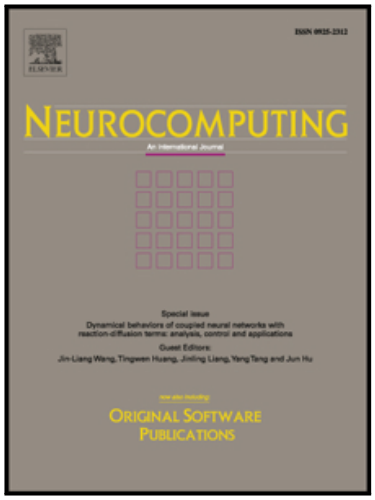

Data-based approximate optimal control for nonzero-sum games of multi-player systems using adaptive dynamic programming

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Data-based approximate optimal control for nonzero-sum games of multi-player systems using adaptive dynamic programming

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Abstract

This paper investigates the non-zerosum game issue for unknown nonlinear systems with multi-player by using data-based adaptive dynamic programming (ADP) methods. It is known that the traditional ADP approaches require accurate system models to compute the solutions of non-zerosum games. However, for the practical nonlinear systems, system models are difficult to be obtained and thus these methods will be invalid. To overcome this difficulty, we propose two neural-network-based identification schemes. Combined with the identification results, we design a data-based actor-critic algorithm to learn and approximate the optimal solutions in real time. Subsequently, in order to reduce the computation burden of dual network algorithm, we develop a single network one. To test the feasibility and validity of our schemes, we provide two simulation examples including a linear one and a nonlinear one.

Keywords: Reinforcement learning; Adaptive dynamic programming; Data-based; Neural networks.

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