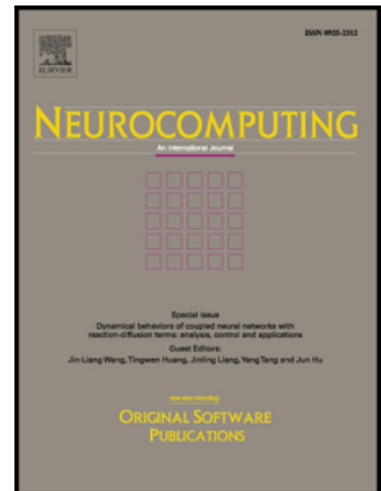


## Accepted Manuscript

General value iteration based reinforcement learning for solving optimal tracking control problem of continuous-time affine nonlinear systems

Geyang Xiao, Huaguang Zhang, Yanhong Luo, Qiuxia Qu

PII: S0925-2312(17)30553-2  
DOI: [10.1016/j.neucom.2017.03.038](https://doi.org/10.1016/j.neucom.2017.03.038)  
Reference: NEUCOM 18266



To appear in: *Neurocomputing*

Received date: 19 September 2016  
Revised date: 4 January 2017  
Accepted date: 14 March 2017

Please cite this article as: Geyang Xiao, Huaguang Zhang, Yanhong Luo, Qiuxia Qu, General value iteration based reinforcement learning for solving optimal tracking control problem of continuous-time affine nonlinear systems, *Neurocomputing* (2017), doi: [10.1016/j.neucom.2017.03.038](https://doi.org/10.1016/j.neucom.2017.03.038)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# General value iteration based reinforcement learning for solving optimal tracking control problem of continuous-time affine nonlinear systems

Geyang Xiao, Huaguang Zhang\*, Yanhong Luo, Qiuxia Qu

*College of Information Science and Engineering, Northeastern University, Box 134,  
110819, Shenyang, P.R. China*

*The Key Laboratory of Integrated Automation of Process Industry (Northeastern  
University) of the National Education Ministry, 110004, Shenyang, P.R. China*

---

## Abstract

In this paper, a novel reinforcement learning (RL) based approach is proposed to solve the optimal tracking control problem (OTCP) for continuous-time (CT) affine nonlinear systems using general value iteration (VI). First, the tracking performance criterion is described in a total-cost manner without a discount term which can ensure the asymptotic stability of the tracking error. Then, some mild assumptions are assumed to relax the restriction of the initial admissible control in most existing references. Based on the proposed assumptions, the general VI method is proposed and three situations are considered to show the convergence with any initial positive performance function. To validate the theoretical results, the proposed general VI method is implemented by two neural networks on a nonlinear spring-mass-damper system and two situations are considered to show the effectiveness.

*Keywords:* Adaptive dynamic programming, optimal control, reinforcement learning, continuous-time systems

---

\*Corresponding author

*Email addresses:* xgyalan@outlook.com (Geyang Xiao), hgzhang@ieee.org (Huaguang Zhang\*), neuluo@gmail.com (Yanhong Luo), quqiuxia2010@163.com (Qiuxia Qu)

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات