



Journal Menu

- [Abstracting and Indexing](#)
- [Aims and Scope](#)
- [Article Processing Charges](#)
- [Articles in Press](#)
- [Author Guidelines](#)
- [Bibliographic Information](#)
- [Contact Information](#)
- [Editorial Board](#)
- [Editorial Workflow](#)
- [Reviewers Acknowledgment](#)
- [Subscription Information](#)

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issue Guidelines](#)

[Call for Proposals for
Special Issues](#)

Modelling and Simulation in Engineering
Volume 2008 (2008), Article ID 343940, 8 pages
doi:10.1155/2008/343940

Research Article

Stability Analysis of Neural Networks-Based System Identification

Talel Korkobi, Mohamed Djemel, and Mohamed Chtourou

Research Unit on Intelligent Control, Design and Optimization of Complex Systems (ICOS), National Engineering School of Sfax (ENIS), University of Sfax, BP W, 3038 Sfax, Tunisia

Received 28 January 2008; Revised 23 April 2008; Accepted 12 June 2008

Academic Editor: Petr Musilek

[Abstract](#)

[Full-Text PDF](#)

[Full-Text HTML](#)

[Linked References](#)

[How to Cite this Article](#)

Abstract

This paper treats some problems related to nonlinear systems identification. A stability analysis neural network model for identifying nonlinear dynamic systems is presented. A constrained adaptive stable backpropagation updating law is presented and used in the proposed identification approach. The proposed backpropagation training algorithm is modified to obtain an adaptive learning rate guarantying convergence stability. The proposed learning rule is the backpropagation algorithm under the condition that the learning rate belongs to a specified range defining the stability domain. Satisfying such condition, unstable phenomena during the learning process are avoided. A Lyapunov analysis leads to the computation of the expression of a convenient adaptive learning rate verifying the convergence stability criteria. Finally, the elaborated training algorithm is applied in several simulations. The results confirm the effectiveness of the CSBP algorithm.