

## Learning Algorithms for Fuzzy Inference Systems Composed of Double- and Single-Input Rule Modules

**Authors :** Hirofumi Miyajima, Kazuya Kishida, Noritaka Shigei, Hiromi Miyajima

**Abstract :** Most of self-tuning fuzzy systems, which are automatically constructed from learning data, are based on the steepest descent method (SDM). However, this approach often requires a large convergence time and gets stuck into a shallow local minimum. One of its solutions is to use fuzzy rule modules with a small number of inputs such as DIRMs (Double-Input Rule Modules) and SIRMs (Single-Input Rule Modules). In this paper, we consider a (generalized) DIRMs model composed of double and single-input rule modules. Further, in order to reduce the redundant modules for the (generalized) DIRMs model, pruning and generative learning algorithms for the model are suggested. In order to show the effectiveness of them, numerical simulations for function approximation, Box-Jenkins and obstacle avoidance problems are performed.

**Keywords :** Box-Jenkins's problem, double-input rule module, fuzzy inference model, obstacle avoidance, single-input rule module

**Conference Title :** ICMLT 2016 : International Conference on Machine Learning and Technology

**Conference Location :** Singapore, Singapore

**Conference Dates :** March 03-04, 2016