



# An Approach to Fuzzy Modeling of Anti-lock Braking Systems

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## Abstract

This chapter proposes an approach to fuzzy modeling of Anti-lock Braking Systems (ABSs). The local state-space models are derived by the linearization of the nonlinear ABS process model at ten operating points. The Takagi-Sugeno (T-S) fuzzy models are obtained by the modal equivalence principle, where

the local state-space models are the rule consequents. The optimization problems are defined in order to minimize the objective functions expressed as the squared modeling errors, and the variables of these functions are a part of the parameters of input membership functions. Simulated Annealing algorithms are implemented to solve the optimization problems and to obtain optimal T-S fuzzy models. Real-time experimental results are included to validate the new optimal T-S fuzzy models for ABS laboratory equipment.

## Keywords

Anti-lock braking systems   Optimization   Real-time experiments   Simulated annealing  
Takagi-Sugeno fuzzy models

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# Notes

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