FUZZY MODEL BASED SOLVING NONLINEAR SYSTEMS WITH CASE STUDY OF TRUCK-TRAILER SYSTEM

Priyo Sidik Sasongko, Indriyati, Eko Adi Sarwoko
Jurusan Matematika FMIPA UNDIP
Jl. Prof. Soedarto, Tembalang Semarang.

Abstract. *In this paper, we consider the fuzzy controller problem for nonlinear system using fuzzy models. The controller is constructed using a design model of the dynamical process to be controlled. The design model obtained from the truth model using a fuzzy modeling approach. The Takagi-Sugeno fuzzy model is adopted for fuzzy modeling of the nonlinear system. The truth model represents a detailed description of the process dynamic. The model is used in a simulation to evaluate the performance of the controller design. Stabilization of the closed-loop discrete Takagi-Sugeno systems using the well-known PDC (Paralel Distributed Compensation) technique is investigated. The design procedure we adopt is to convert the design of the controller to a Linear Matrix Inequality (LMI) problem so that the stability of the whole system can be assured.*

Keywords: nonlinear system, truck-trailer system, fuzzy discrete Takagi-Sugeno Model, PDC, LMI