



A NEW METHOD FOR LINGUISTIC MODELING WITH STABILITY ANALYSIS AND APPLICATIONS

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ABSTRACT—This paper presents a new approach for linguistic system modeling which is also suitable for stability analysis of linguistic models. First we present an approach, which is called *infinite place* model, described using modified fuzzy Petri net, with uses a new *place* definition based on physical infinity state concept. This method has some practical difficulties, which are taking care of in the second approach called *variation* model. This paper presents the above methodologies with some definitions and a *necessary and sufficient condition* for stability of a class of linguistic fuzzy system. This stability analysis is verified using some benchmark systems simulations

Key Words: Fuzzy modeling, Stability analysis, Necessary and sufficient condition for stability analysis, Fuzzy Petri net, Linear time invariant systems and linguistic modeling