

NORMAL PROCESSES FOR MODELING THE DESIRED BEHAVIOR OF DISTRIBUTED AUTONOMOUS DISCRETE EVENT SYSTEMS

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ABSTRACT

In this paper, we formulate a class of language-based specifications for modeling the desired behavior of a system of distributed autonomous discrete event systems. We model system behavior using a formal language-based representation of a *process*. We identify *singularity* and *congruence* as inherent constraints on processes in such systems. We define *normal* processes to be those that are both singular and congruent, and show that normal processes are well-behaved. In particular, they possess a necessary characteristic for conversion into automaton-based models, i.e., they can be uniquely represented by a formal language.

Keywords: Automaton-based modeling, process modeling, distributed autonomous systems, discrete event systems

1. Introduction

Modern technology has increasingly created man-made dynamic systems [12] and as a result, the study of Discrete Event Dynamic Systems (DEDS) continues to be an active area of research. Numerous approaches to the modeling of discrete event dynamic systems have been presented in the literature and are summarized by CAO and HO [9] and CASSANDRAS [10]. The use of language-based models to define the behaviors of