Full Title*

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1 INTRODUCTION

- Interleaving based semantics VS partial order/graph based semantics
- Synchronous and asynchronous communication
- The problem of synchronizability

2 PRELIMINARIES/BASICS

- Communicating systems (communicating finite-state automata with bag channels)
- MSCs and conflict graph
- Monadic Second-Order logic on MSCs
- (Language of a system as a set of MSCs)
- (Model checking and synchronizability)

3 ASYNCHRONOUS COMMUNICATION MODELS OVERVIEW

- Overview of asynchronous variants
- High-level description of each variant along with references to implementations (if existing)
- (Definitions based on linearization, intuitive)
- (Language of a system with a given communication model as a set of MSCs)
- Hint of hierarchy result

4 ASYNCHRONOUS COMMUNICATION MODELS OPERATIONAL SEMANTICS

- TODO...

5 ASYNCHRONOUS COMMUNICATION MODELS AS CLASSES OF MSCS, MSO-DEFINABILITY

- Definition of MSC class for each communication model (alternative definitions)
- MSO-definability of each class

6 EQUIVALENCE OF THE TWO DEFINITIONS

- TODO...

7 HIERARCHY OF ASYNCHRONOUS CLASSES OF MSCS

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machine $\%_i$ having a single incoming FIFO channel, which is shared by the other machines that can send messages to $\%_i$. A send event consists in adding the message at the end of the queue of the destination peer. This architecture is equivalent to the "FIFO =−1" communication model in [Chevrou et al. 2016].

- *FIFO* 1−= *(mailbox)*: in a 1−= architecture, the messages sent from a single machine are always delivered in their send order, independently of the recipients. Its implementation is not expensive: each machine has a unique queue to store sent messages. The recipients fetch messages from this queue and acknowledge their reception. After the acknowledgement, the next message in the queue can be fetched. This architecture is equivalent to the "FIFO 1−=" communication model in [Chevrou et al. 2016].
- *FIFO* =−=: this architecture can be modeled as a unique shared FIFO channel. Messages are globally ordered and delivered according to the their emission order. As noted in [Chevrou et al. 2016], this model is generally unrealistic and its implementations are ine□cient.

For convenience, we will refer to a system that uses the p2p architecture simply as a p2p system. The same shorthand will be used for the other communication architectures. Note that, for each of these communicating architectures, there may be other equivalent ways of describing/modeling them.

A APPENDIX

Text of appendix …

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