Parallel Discrete Event Simulation in Haskell

A functional approach

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ABSTRACT

TODO: submit to a journal

KEYWORDS

Agent-Based Simulation, Functional Reactive Programming, Property-Based Testing, Haskell

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1 INTRODUCTION

main message: optimistic PDES needs rollback of events which is particularly easily achieved in Haskell because: 1. it has persistent immutable data-structure resulting in a new version after an update where one still can hold the old version, 2. one can restrict side-effects to one which are guaranteed to be able to rollback and not having an effect on the real-world e.g. IO

because DES can be the foundation for an event-driven ABS we benefit from looking at PDES as well to get inspiration for parallelisation of ABS

rollback should be easy with SFs as well. with MSFs more delicate because of side-effects

Contribution: first ones to describe haskells immutable data properties and STM to implement PDES

TODO: implement DES in Haskell TODO: implement an optimistic PDES in Haskell

2 RELATED WORK

In his masterthesis [1] the author investigated Haskells parallel and concurrency features to implement (amongst others) *HDES*, a lazy PDES framework. TODO: read this part

3 BACKGROUND

TODO: Parallel Discrete Event Simulation, Fujimoto [2] TODO: Parallel Discrete Event Simulation The Making Of A Field, Fujimoto [3] TODO: Parallel Discrete-Event Simulation Framework, Miranda [5] TODO: Parallel Discrete-Event Simulation Applications, Tropper [6] TODO: Parallel DiscreteâĂŘEvent Simulation, Liu [4] TODO: DEVS Book, Zeigler [7]

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