POLYTECHNIC UNIVERSITY OF CATALONIA

MASTER THESIS

SafeDM a light-lockstep approach

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A thesis submitted in fulfillment of the requirements
for the degree of Master's degree in Electronic Engineering

in the

Research Group Name
Department or School Name

May 21, 2022

Declaration of Authorship

I, Francisco BAS JALÓN, declare that this thesis titled, "SafeDM a light-lockstep approach" and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
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- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

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"Thanks to my solid academic training, today I can write hundreds of words on virtually any topic without possessing a shred of information, which is how I got a good job in journalism."

Dave Barry

Polytechnic University of Catalonia

Abstract

Faculty Name
Department or School Name

Master's degree in Electronic Engineering

SafeDM a light-lockstep approach

by Francisco BAS JALÓN

The Thesis Abstract is written here (and usually kept to just this page). The page is kept centered vertically so can expand into the blank space above the title too...

Acknowledgements

The acknowledgments and the people to thank go here, don't forget to include your project advisor...

Contents

List of Figures

List of Tables

List of Abbreviations

LAH	**L**ist **A**bbreviations **H**ere
WSF	**W**hat (it) **S**tands **F**or

Physical Constants

Speed of Light $c_0 = 2.997\,924\,58 \times 10^8\,\mathrm{m\,s^{-1}}$ (exact)

List of Symbols

a	distance	m
P	power	W ($\mathrm{J\,s^{-1}}$)
ω	angular frequency	rad

For/Dedicated to/To my…

Chapter 1

Introduction

1.1 Motivation

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1.2 Contribution

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1.3 Structure of the Thesis

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Chapter 2

Background

2.1 Fault, Failures and Errors

2.2 Safety Related Systems

2.3 Fault detection

2.4 Redundancy and Sphere of Replication

2.5 Diversity

2.6 Lockstep execution

2.6.1 Hardware Lockstep Execution

2.6.2 Software Lockstep Execution

2.7 Other Fault detection Approaches

Chapter 3

SafeDE

3.1 SafeDE Motivation

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3.2 Architecture

3.3 Features and limitations analysis

3.4 N-modular redundancy

3.5 SafeDE Implementantion and Integration

3.5.1 De-RISC Platform

3.5.2 SELENE Platform

3.5.3 Hardware Integration

3.5.4 Configuration and Operation

3.5.5 Software Integration

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3.6 SafeDE Evaluation

3.6.1 Functional Validation

3.6.2 Fault Injection

3.6.3 Time Overhead

3.6.4 Hardware Costs

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3.7 Conclusions

Chapter 4

Conclusions and Future Work

Appendix A

Published Work

Write your Appendix content here.