

Dissertation

**Numerical study of the crack path selection  
problem based on the variational fracture theory**  
変分型破壊理論に基づく亀裂経路選択問題の数値的研究

Graduate School of Natural  
Sciences and Technology,  
Kanazawa University

Division of Mathematical and  
Physical Sciences

1924012007

Name: Alifian Mahardhika Maulana

Chief advisor: Professor Masato Kimura

November 2022

KANAZAWA UNIVERSITY

*Abstract*

Graduate School of Natural Sciences and Technology  
Division of Mathematical and Physical Sciences

Doctor of Science

**Numerical study of the crack path selection problem based on the  
variational fracture theory**

by Alifian Mahardhika Maulana

Citation [\[1\]](#) *keyword:*

KANAZAWA UNIVERSITY

# *Abstrak*

Graduate School of Natural Sciences and Technology  
Division of Mathematical and Physical Sciences

Doctor of Science

**Numerical study of the crack path selection problem based on the  
variational fracture theory**

by Alifian Mahardhika Maulana

Ini abstrak dalam bahasa Indonesia Sitasi [\[1\]](#) *kata kunci:*

# *Acknowledgements*

I would like to thank

# Contents

Abstract	i
Abstrak	ii
Acknowledgements	iii
Contents	iv
List of Figures	v
List of Tables	vi
Abbreviations	vii
Physical Constants	viii
Symbols	ix
1 Introduction	1
2 Basic Theory	2
3 Method	3
4 Numerical Example	4
5 Conclusion	5
A Notation	6
B Numerical code	7
References	8

# List of Figures

# List of Tables

# Abbreviations

**LAH** List Abbreviations **Here**



# Physical Constants

Speed of Light  $c = 2.997\,924\,58 \times 10^8 \text{ ms}^{-1}$  (exact)

# Symbols

$a$	distance	m
$P$	power	W ( $\text{Js}^{-1}$ )
$\omega$	angular frequency	$\text{rads}^{-1}$

*For/Dedicated to/To my...*

# Chapter 1

## Introduction

## Chapter 2

# Basic Theory

## Chapter 3

### Method

## Chapter 4

# Numerical Example

## Chapter 5

## Conclusion



## Appendix A

### Notation

## Appendix B

### Numerical code

# References

- [1] Tetsuhiko Miyoshi. Direction and curvature of the cracks in two-dimensional elastic body. *Japan Journal of Industrial and Applied Mathematics*, 17(2):295–307, June 2000. ISSN 0916-7005, 1868-937X.