



**RUIN PROBABILITY IN CLASSICAL RISK PROCESS WITH
WEIBULL CLAIMS DISTRIBUTION**

UNDERGRADUATE THESIS

**Submitted as one of the requirements to obtain
Sarjana Aktuaria (S. Aktr)**

By:

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FACULTY OF BUSINESS

ACTUARIAL SCIENCE STUDY PROGRAM

CIKARANG, BEKASI

APRIL 2023

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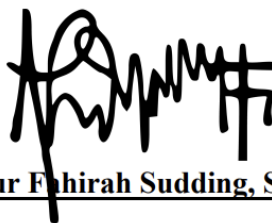
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ABSTRACT

In the classical risk process, ruin is the situation when the surplus process falls to zero or below. To predict the ruin, ruin probability can be estimated to avoid the probability of bankruptcy in an insurance company. Moreover, the ruin probability is calculated through survival probability, which when ruin does not occur. In case where the function is of exponential order, the ruin probability is calculated using the Laplace transform. In other case, numerical approximations such as Euler's method and Trapezoidal rule is used. Ruin and survival probability show that when the survival probability moves to 1, the ruin probability moves to 0.

Keywords: *Ruin probability, Survival probability, Laplace transform, Weibull distribution, Euler's method, Trapezoidal rule*

ABSTRAK

Dalam proses risiko klasik, kebangkrutan adalah situasi ketika proses surplus turun menjadi nol atau lebih rendah. Untuk memprediksi kebangkrutan, probabilitas kebangkrutan dapat diperkirakan untuk menghindari kemungkinan kebangkrutan di suatu perusahaan asuransi. Selain itu, probabilitas kebangkrutan dihitung melalui probabilitas *survival*, yang dimana kebangkrutan tidak terjadi. Dalam kasus saat fungsi berorde eksponensial, probabilitas kebangkrutan dihitung menggunakan transformasi *Laplace*. Dalam kasus lain, aproksimasi numerik yaitu metode Euler dan aturan Trapesium digunakan. Probabilitas kebangkrutan dan *survival* menunjukkan bahwa ketika probabilitas *survival* bergerak ke 1, probabilitas kebangkrutan bergerak ke 0.

Kata kunci: *Probabilitas kebangkrutan, Probabilitas Survival, Transformasi Laplace, Distribusi Weibull, Metode Euler, Aturan trapesium*

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"Thou shalt tread upon the lion and adder: the young lion and the dragon shalt thou trample under feet." - Psalms 91:13

"The LORD himself goes before you and will be with you; he will never leave you nor forsake you. Do not be afraid; do not be discouraged." - Deuteronomy 31:8

"Jesus Christ is the same yesterday and today and forever." - Hebrews 13:8

Bekasi, May 10th, 2023

A handwritten signature in black ink, consisting of several fluid, overlapping strokes that form a stylized representation of the name Theresia Stefany Anawa Siahaan.

Theresia Stefany Anawa Siahaan

TABLE OF CONTENTS

COVER PAGE.....	i
PANEL OF EXAMINERS APPROVAL	ii
STATEMENT OF ORIGINALITY	iii
SCIENTIFIC PUBLICATION APPROVAL FOR ACADEMIC INTEREST	iv
ADVISOR’S APPROVAL FOR PUBLICATION.....	v
PLAGIARISM REPORT	vi
ARTIFICIAL INTELLIGENCE REPORT	vii
ABSTRACT.....	viii
ABSTRAK.....	ix
ACKNOWLEDGEMENT	x
TABLE OF CONTENTS.....	xii
LIST OF FIGURES	xiv
LIST OF TABLES	xv
CHAPTER I INTRODUCTION.....	1
1.1 Research Background.....	1
1.2 Research Questions	4
1.3 Research Objectives	4
1.4 Scope and Limitations	4
1.5 Research Benefits	4
1.6 Research Outline	5
CHAPTER II LITERATURE REVIEW.....	7
2.1 Basic Probability Concepts	7
2.1.1 Discrete Random Variables.....	8

2.1.2	Continuous Random Variables	9
2.1.3	Poisson Process	11
2.2	Classical Risk Process	13
2.2.1	Ruin Probability	14
2.3	Laplace Transform	17
2.4	Euler’s Method	19
2.5	Trapezoidal Rule	20
2.6	Weibull Claims Distribution	21
2.7	Research Gap.....	25
CHAPTER III METHODOLOGY		27
3.1	Research Framework	27
3.2	Computation Steps	29
CHAPTER IV RESULT AND DISCUSSION		31
4.1	Case 1 ($\alpha = 1$)	31
4.2	Case 2 ($\alpha > 1$)	36
CHAPTER V CONCLUSION AND SUGGESTION.....		44
5.1	Conclusion.....	44
5.2	Suggestion	44
REFERENCES.....		46
APPENDIX.....		49

LIST OF FIGURES

Figure 2.1 Surplus process graph.....	14
Figure 2.2 Trapezoidal partition.....	20
Figure 2.3 Trapezoidal rule illustration.....	21
Figure 3.1 Research Flowchart	30
Figure 4.1 Survival vs Ruin Probability for example Case 4.1.....	36
Figure 4.2 The graph of PDF example Case 4.2.....	40
Figure 4.3 Survival vs Ruin Probability for example Case 4.2.....	43

LIST OF TABLES

Table 2.1 Laplace transform functions.....	19
Table 4.1 The survival probabilities in example Case 4.2.....	43