

**PROCESS PLANT INSTRUMENTATION MONITORING
CAPABILITIES ASSESSMENT AND UPGRADE**

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ABSTRACT

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Expressions for assessing the expected financial loss associated to the accuracy of the instrumentation and the associated probability in the presence of two and more gross errors have been developed in previous work. However, these expressions were given in a form of integrals without closed form solution. This work presents two methods for calculating the expected financial loss and the associated probability when two or more gross errors are present in a system: approximation method and Monte Carlo method. The two methods are compared by two criteria: accuracy of solution and computation time. Short computation time is important because financial loss calculations can be used in sensor network design, which needs to explore many alternatives combinatorially. The results confirm that the approximation method needs less computation time and provides satisfactorily accurate solutions. The results also confirm that financial loss in the presence of biases is larger than financial loss without biases and that financial loss increases when more biases are present.

บทคัดย่อ

กูเยน ทาน เด็ช แควง : การปรับปรุงและประเมินความสามารถของอุปกรณ์การวัดค่า
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การประเมินค่าความสูญเสียทางเศรษฐศาสตร์ ซึ่งเกี่ยวข้องกับความแม่นยำของอุปกรณ์
การวัดค่า และความน่าจะเป็นของการเกิดความผิดพลาดในอุปกรณ์วัดค่าที่มากกว่า 2 แห่ง ได้
เคยมีการทำการวิจัยแล้วอย่างไรก็ตาม การประเมินค่าดังกล่าวได้ถูกคำนวณ ในรูปของการ
อินทิเกรต ที่ไม่ใช่คำตอบแบบปิด งานวิจัยนี้มี 2 วิธี ได้แก่ วิธีแบบประมาณ และ วิธีมอนติคาร์โล
ซึ่งใช้ในการคำนวณค่าความสูญเสียทางเศรษฐศาสตร์ และ ความน่าจะเป็น ของการเกิดความผิดพลาด
ในอุปกรณ์วัดค่าที่มากกว่า 2 แห่งในระบบหนึ่งๆ ทั้ง 2 วิธีถูกเปรียบเทียบโดยใช้เกณฑ์ความแม่น
ยำของค่าที่คำนวณได้ และเวลาที่ใช้ในการคำนวณ ค่าความสูญเสียทางเศรษฐศาสตร์สามารถ
ถูกใช้ในการออกแบบเครือข่ายเครื่องตรวจวัดค่าในหลายรูปแบบ ผลการวิจัยพบว่าวิธีแบบ
ประมาณใช้เวลาคำนวณน้อยกว่าและให้ค่าความแม่นยำที่สูงกว่านอกจากนี้ค่าความสูญเสียทางเศ
รษฐศาสตร์จะเพิ่มขึ้นเมื่อมีค่าเบี่ยงเบนเกิดขึ้นในระบบ

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TABLE OF CONTENTS

	PAGE
Title Page	i
Abstract (in English)	iii
Abstract (in Thai)	iv
Acknowledgements	v
Table of Contents	vi
List of Tables	viii
List of Figures	ix
 CHAPTER	
I INTRODUCTION	1
 II BACKGROUND AND LITERARURE SURVEY	
2.1 Overview of Data Reconciliation	3
2.2 Formulation of Data Reconciliation Problem	3
2.3 Redundancy and Observability	4
2.4 Data Reconciliation In Linear Steady State System With All Variables Measured	5
2.5 Data Reconciliation In Linear Steady State System With Both Measured And Unmeasured Variables	6
2.6 Importance of Gross Error Detection	7
2.7 Hypothesis Testing For Gross Error Detection	8
2.8 Equivalency Theory	12
2.9 Simultaneous Strategies For Data Reconciliation and Gross Error Detection	13
2.10 Concept of Software Accuracy	19
2.11 Economic Value of Precision In The Monitoring of Linear Systems	20

CHAPTER	PAGE
2.12 Economic Value of Accuracy In Linear Systems	22
2.13 Problem Statement	27
2.14 Literature Survey	27
III METHODOLOGY	30
3.1 Identifying Different Regions According To The Presence of Undetected Gross Errors.	30
3.2 Methods For Calculating Integral Expressions For The Financial Loss And The Probability	35
3.2.1 Approximation Method	37
3.2.2 Monte Carlo Method	41
IV RESULTS AND DISCUSSION	45
4.1 Example Process: Case Study	45
4.1.1 The Financial Loss And The Probability In The Presence of Multiple Gross Errors	46
4.1.2 Effect of Changing Parameters	57
4.2 Summary	59
V CONCLUSIONS AND RECOMMENDATIONS	60
REFERENCES	62
APPENDIX	64
CURRICULUM VITAE	69

LIST OF TABLES

TABLE		PAGE
4.1	DEFL/ K_sT for two gross errors present in the system obtained by using the two methods	46
4.2	DEFL/ K_sT for two gross errors present in the system obtained by using the approximation method at different interval sizes	47
4.3	The probability for two gross errors present in the system obtained by using the two methods	50
4.4	Probability for two gross errors present in the system obtained by using the approximation method at different interval sizes	51
4.5	DEFL/ K_sT for three gross errors present in the system obtained by using the two methods	52
4.6	The probability for three gross errors present in the system obtained by using the two methods	54
4.7	DEFL/ K_sT for four gross errors present in the system obtained by using the two methods	55
4.8	The probability for four gross errors present in the system obtained by using the two methods	56
4.9	DEFL/ K_sT for mutiple gross errors present in the system obtained by using the approximation method when parameters are changed	57
4.10	Probability for mutiple gross errors present in the system obtained by using the approximation method when parameters are changed	58

LIST OF FIGURES

FIGURE		PAGE
2.1	Material balance in a refinery	20
3.1	Different regions when two gross errors are present in the system	30
3.2	Approximation method	38
3.3	Regions used in calculation	39
4.1	Example process	45