

# Contents

---

<b>1. Introduction</b>	<b>1</b>
<b>2. Related Works</b>	<b>4</b>
<b>2.1 Cluster Analysis</b>	<b>4</b>
2.1.1 Chi2 Algorithm (Liu and Setiono, 1995)	4
<b>2.2 Rule Extraction Techniques</b>	<b>6</b>
2.2.1 NeuroLinear (Setiono and Liu, 1997)	6
Neural Network Training and Pruning	6
Rule Generation	8
2.2.2 STARE (Zhou et al., 2000)	10
Data Generation	10
Continuous Attribute Processing	10
Rule Creation	11
Priority Formation	12
Fidelity Evaluation	13
2.2.3 CREFANN (Gaweda et al., 2000)	15
Rule Extraction Algorithm	15
Rule-based Approximation Algorithm	16
2.2.4 REFANN (Setiono et al., 2002)	17
Neural Network Training and Pruning Algorithm	17
To Approximate Hidden Node Activation Function	20
Rule Generation	22
2.2.5 RN2 (Satio and Nakano, 2002)	24
Neural Network Training	24
Method for Rule Extraction	26
<b>2.3 Discussion</b>	<b>29</b>
<b>3. Methodology</b>	<b>32</b>
<b>3.1 Definition</b>	<b>32</b>
<b>3.2 Method of Extracting Rules from Neural Networks</b>	<b>33</b>
3.2.1 The Approximation of Hidden Node Activation Function	33
3.2.2 The Differential Analysis of Rules	36
3.2.3 The Rule Extraction Process	38
<b>4. Empirical Study</b>	<b>40</b>
<b>4.1 Bond Pricing</b>	<b>40</b>

<b>4.2 Data Collection and Method Application .....</b>	<b>42</b>
<b>4.3 Results and Analysis .....</b>	<b>49</b>
<b>5. Conclusions and Future Work_____</b>	<b>52</b>
<b>5.1 Conclusions.....</b>	<b>52</b>
<b>5.2 Future Work.....</b>	<b>53</b>
<b>References _____</b>	<b>54</b>