

# Research on Mathematical Dialectical Logic for Intelligent Information Processing <sup>†</sup>

Huacan He <sup>1,\*</sup>, Yanquan Zhou <sup>2</sup> and Zhicheng Chen <sup>3</sup>

<sup>1</sup> School of Computer, Northwestern Polytechnical University, Xi'an, China. P.C:710072;  
[hehuac@nwpu.edu.cn](mailto:hehuac@nwpu.edu.cn)

<sup>2</sup> School of Computer, Beijing University of Posts and Telecommunications. Beijing, China, P.C:100876;  
[zhouyanquan@bupt.edu.cn](mailto:zhouyanquan@bupt.edu.cn)

<sup>3</sup> Room 208 of Building A, Zhongguancun Intelligent Manufacturing Way, Haidian District, Beijing, China, P.C:100083; [gfdtek@163.com](mailto:gfdtek@163.com)

\* Correspondence: [hehuac@nwpu.edu.cn](mailto:hehuac@nwpu.edu.cn); Tel.: +86-136-9130-9054

† Presented at the IS4SI 2017 Summit DIGITALISATION FOR A SUSTAINABLE SOCIETY, Gothenburg, Sweden, 12-16 June 2017.

Academic Editor: Yixin Zhong

Received: 15 April 2017.; Accepted: 15 April 2017.; Published: 9 June 9, 2017

**Abstract:** Information ecology requires the support of intelligent information processing, while the latter requires the support of mathematical dialectical logic. This paper introduces the research status and prospect of mathematical dialectical logic for intelligent information processing, including: 1. several basic assumptions (axioms) about information and intelligence; 2. based on mathematical formal logic, gradually liberalizing the constraints to establish the research compendium of mathematical dialectical logic theory system; 3. according to the forming mechanism of various uncertainties, the principles and methods of defining and generating the complete operator cluster of mathematical dialectical logic on propositional level, establishing the complete operator library of intelligent information processing; 4. two application methods of the operator library in intelligent information processing; 5. prospects.

**Keywords:** information ecology; intelligent information processing; mathematical dialectical logic; uncertainty reasoning; operator library.