Oppositional Logic

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Abstract. In intuitionistic logic system, constructive negation operator complies with the law of contradiction but not the law of excluded middle in intuitionistic logic system. In da Costa's paraconsistent logic system, paraconsistent negation operator complies with the law of excluded middle but not the law of contradiction. Putting aside classical negation operator, both intuitionistic logic and da Costa's paraconsistent logic establish logic systems by directly introducing new negation operators basing on the positive proposition logic. This paper attempts to make constructive negation operator and paraconsistent negation operator satisfying the conditions mentioned above in classical logical system.

Oppositional logic is an extended system of classical propositional logic. It can be obtained from the classical propositional logic by adding an unary connective $*$ and introducing the definitions of two unary connectives $\triangle$ and ∇ . In oppositional logic system, there are four kinds of negation: the classical negation $\neg$ complying with both law of contradiction and law of excluded middle, the constructive negation ∇ complying with law of contradiction but not law of excluded middle, the paraconsistent negation $\triangle$ complying with law of excluded middle but not law of contradiction, as well as the dialectical negation $*$ complying with neither law of contradiction nor law of excluded middle.

This paper gives the proof of the soundness and completeness theorem of oppositional logic. It also gives the following conclusions:

[1] Oppositional logic can be a kind of tools for paraconsistent theory and intuitionistic theory; the famous Duns Scotus law does not hold according to the paraconsistent negation and the dialectical negation;

[2] In oppositional logic, according to the unary connective $\neg$, $*$, ∇ and $\triangle$, A is in contradictory opposition with $\neg A$; A is in subaltern opposition with $*A$; A is in contrary opposition with ∇A ; A is in subcontrary opposition with $\triangle A$. In this sense, we call the logical system mentioned above oppositional logic.

Keywords: negation, oppositional logic, paraconsistent, intuitionism.

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