

1 On How Kelsenian Jurisprudence and Intuitionistic Logic help to avoid Contrary-to-Duty paradoxes in Legal Ontologies

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Classical Logic has been widely used as a basis for ontology creation and reasoning in many knowledge specific domains. These specific domains naturally include Legal Knowledge and Jurisprudence. As in any other domain, consistency is an important issue for legal ontologies. However, due to their inherently normative feature, coherence (consistency) in legal ontologies is more subtle than in other domains. Consistency, or absence of logical contradictions, seems more difficult to maintain when more than one law system can judge a case. This is called a conflict of laws. There are some legal mechanisms to solve these conflicts, some of them stating privileged fori, other ruling jurisdiction, etc. In most of the cases, the conflict is solved by admitting a law hierarchy or a law precedence. Even using these mechanisms, coherence is still a major issue in legal systems. Each layer in this legal hierarchy has to be consistent. Since consistency is a direct consequence of how one deals with logical negation, negation is also a main concern of legal systems. Deontic Logic, here considered as an extension of Classical Logic, has been widely used to formalize the normative aspects of the legal knowledge. There is some disagreement on using deontic logic, and any of its variants, to this task. Since a seminal paper by Alchourron, the propositional aspect has been under discussion. In this case, *laws* are not to be considered as propositions. This is in full agreement with Hans Kelsen jurisprudence. On a Kelsenian approach to Legal Ontologies, the term “Ontologies on laws” is more appropriate than “Law ontologie”. In previous works we showed that Classical logic is not adequate to cope with a Kelsenian based Legal Ontology. Because of the ubiquitous use of Description Logic for expressing ontologies nowadays, we developed an Intuitionistic version of Description

Logic particularly devised to express Legal Ontologies. This logic is called iALC.

In this work we show how the iALC avoids some Contrary-to-duty paradoxes, as Chisholm's paradoxes and its variants. For each of these paradoxes we provide an iALC model. Finally we discuss the main role of the intuitionistic negation in this issue, finding out that its success may be a consequence of its paracomplete logical aspect. An investigation on the use of other paracomplete logics in accomplish a logical basis for Kelsenian legal ontologies is highly motivated.