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Relevance and Paraconsistency—A New Approach Part II: The Formal Systems

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Abstract In part I of this paper we introduced what we called "relevance structures". These algebraic structures are based on the idea of relevance domains which are graded according to "degrees of reality" and related (or not) by a certain relevance relation. In the present part we describe the logic RMI which corresponds to these structures, proving it to be sound and strongly complete relative to them. The language of RMI is similar to that of the systems of Anderson and Belnap, but unlike them it is purely intensional: no extensional connective is definable in it, and all its primitive binary connectives have the variable-sharing property. We show that the expressive power of RMI is nevertheless very strong and sufficient for all our needs. In addition, we investigate the main fragments of RMI, as well as its most important extensions. One of these extensions is the system RM (of Dunn and McCall), which is obtained from RMI by adding an axiom to the effect that any two sentences are relevant to each other.

Introduction Our central problems in this work are to find out how a use of inconsistent theories is possible, what kinds of logics can be so used, and what are the possible justifications for it. Henceforth, we shall follow da Costa [11] in calling logics that allow inconsistencies "paraconsistent"; that is to say, a paraconsistent logic is one in which an inconsistency does not necessarily imply everything. Besides their obvious philosophical interest, such logics may also play a practical role (see Nillson [17], p. 408), e.g., we may like to have a computerized system for deriving conclusions which can act efficiently even when it is fed with inconsistent information.

The main difficulty any paraconsistent logic has to overcome is what is

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