

A CALCULUS OF MATRICAL DESCRIPTORS

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We present a formal system which, in a particular and limited sense, contains but is not contained in propositional calculus. Section 1 of our paper discusses the motivation underlying the system's development. Section 2 and section 3 present the system itself, and the final section establishes its relationship to propositional calculus. The aim of our paper is simply to arouse interest, and no attempt has been made to treat the subject exhaustively.

1 *What Matrical Descriptors Are* Anyone who has used matrices for the separation of propositional axioms will be aware of some properties of matrices necessary and sufficient for the verification of certain formulae. To verify $C\dot{p}p$, for example, a matrix need merely have designated values on its diagonal. To verify $C\dot{p}Cq\dot{q}$, all that is needed is that the elements \dot{ij} , where j appears on the diagonal, take designated values. Observations like these can be made about formulae in more than a single dyadic functor. The formula $NC\dot{p}p$ will be verified if and only if all the values on the diagonal of the matrix used for the dyadic functor take designated values when they are treated as elements of the matrix used for the monadic functor, and the formula $C\dot{p}NCq\dot{r}$ will be verified if and only if the values of elements \dot{ij} are designated, when j is the value on the monadic matrix for any element that occurs as a value in the dyadic matrix. As the complexity of formulae increases, so does the cumbersomeness of the type of observation we have been making. Propositional formulae are structured so as to interpret readily as statements about propositions, and not as statements about matrices. This latter role is the one that matrical descriptors are designed to play: the system aims to encompass the minimal formal apparatus required to state for any given propositional formula, the necessary and sufficient conditions for a matrix to verify it. A precursor system of the present one was proposed in an RCA Corporation technical report, "The System RCV", distributed by this author in 1966. That system's structure, however, differs fundamentally from the present system's, and constitutes a much less fruitful approach to the problem.

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