

- ▶ ANAHIT CHUBARYAN, ARTUR KHAMISYAN, ARMAN TSHITOYAN, *Some new proof systems for a version of many-valued logics and proof complexities in it.*

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Some method for construction a deductive full propositional calculi for some version of  $k$ -valued ( $k \geq 3$ .) logic is described in the paper. The propositional connectives are defined as follows: *conjunction* is *min*, *disjunction* is *max*, *negation* is defined by permuting the truthvalues cyclically. We use as literals the propositional variables, variables with negation, with double negations, with triple negations etc. We generalize the notions of determinative conjunct and determinative disjunctive normal form (dDNF), introduced by first coauthor for two-valued Boolean functions in [1], and on the base of it construct the systems  $E_k$ , axioms of which are not fixed. Each conjunct from some dDNF of given formula can be considered as an axiom. The elimination rule (*e*-rule) infers conjunct  $K' \cup K'' \cup K''' \cup \dots$  from conjuncts  $K' \cup \{p\}$ ,  $K'' \cup \{\sim p\}$ ,  $K''' \cup \{\sim\sim p\}$  etc. for a propositional variable  $p$ .  $E_k$ -proof is defined as usually. It is obvious that some DNF  $D = \{K_1, K_2, \dots, K_i\}$  is  $k$ -valued tautology iff using *e*-rule we can derive the empty conjunct from axioms  $\{K_1, K_2, \dots, K_i\}$ . We prove also that for every  $k$  there is some sequence of  $k$ -valued tautologies, which have in described systems the same by order upper and lower bounds for the main proof complexity characteristics: exponential for lines and size, polynomial for space and width.

[1] AN. CHUBARYAN, ARM. CHUBARYAN, *A new conception of Equality of Tautologies*, **L&PS, Triest, Italy**, Vol. V, No 1, 2007, pp. 3-8.