JOURNAL OF FORMALIZED MATHEMATICS
Volume 11, Released 1999, Published 2003
Inst. of Computer Science, Univ. of Białystok

Predicate Calculus for Boolean Valued Functions. Part IV

Shunichi Kobayashi
Shinshu University
Nagano

Yatsuka Nakamura
Shinshu University
Nagano

Summary. In this paper, we proved some elementary predicate calculus formulae containing the quantifiers of Boolean valued functions with respect to partitions. Such a theory is an analogy of usual predicate logic.

MML Identifier: BVFUNC12.

WWW: http://mizar.org/JFM/Vol11/bvfunc12.html

The articles [5], [7], [6], [4], [3], [1], and [2] provide the notation and terminology for this paper.

In this paper Y denotes a non empty set.

The following propositions are true:

(5)[1] For every element a of $\mathit{Boolean}^Y$ and for every subset G of PARTITIONS(Y) and for all partitions A, B of Y holds $\neg\forall_{\exists_{a,A}G,B}G = \exists_{\forall_{\neg a,A}G,B}G$.

(6) For every element a of $\mathit{Boolean}^Y$ and for every subset G of PARTITIONS(Y) and for all partitions A, B of Y holds $\neg\exists_{\forall_{a,A}G,B}G = \forall_{\exists_{\neg a,A}G,B}G$.

(7) For every element a of $\mathit{Boolean}^Y$ and for every subset G of PARTITIONS(Y) and for all partitions A, B of Y holds $\neg\forall_{\forall_{a,A}G,B}G = \exists_{\exists_{\neg a,A}G,B}G$.

(11)[2] Let a be an element of $\mathit{Boolean}^Y$, G be a subset of PARTITIONS(Y), and A, B be partitions of Y. If G is independent, then $\exists_{\forall_{a,A}G,B}G \Subset \exists_{\exists_{a,B}G,A}G$.

(12) For every element a of $\mathit{Boolean}^Y$ and for every subset G of PARTITIONS(Y) and for all partitions A, B of Y holds $\forall_{\forall_{a,A}G,B}G \Subset \forall_{\exists_{a,A}G,B}G$.

(13) For every element a of $\mathit{Boolean}^Y$ and for every subset G of PARTITIONS(Y) and for all partitions A, B of Y holds $\forall_{\forall_{a,A}G,B}G \Subset \exists_{\forall_{a,A}G,B}G$.

(14) For every element a of $\mathit{Boolean}^Y$ and for every subset G of PARTITIONS(Y) and for all partitions A, B of Y holds $\forall_{\forall_{a,A}G,B}G \Subset \exists_{\exists_{a,A}G,B}G$.

(15) For every element a of $\mathit{Boolean}^Y$ and for every subset G of PARTITIONS(Y) and for all partitions A, B of Y holds $\forall_{\exists_{a,A}G,B}G \Subset \exists_{\exists_{a,A}G,B}G$.

(16) For every element a of $\mathit{Boolean}^Y$ and for every subset G of PARTITIONS(Y) and for all partitions A, B of Y holds $\exists_{\forall_{a,A}G,B}G \Subset \exists_{\exists_{a,A}G,B}G$.

[1] The propositions (1)–(4) have been removed.
[2] The propositions (8)–(10) have been removed.

REFERENCES

[1] Shunichi Kobayashi and Kui Jia. A theory of Boolean valued functions and partitions. *Journal of Formalized Mathematics*, 10, 1998. http://mizar.org/JFM/Vol10/bvfunc_1.html.

[2] Shunichi Kobayashi and Yatsuka Nakamura. A theory of Boolean valued functions and quantifiers with respect to partitions. *Journal of Formalized Mathematics*, 10, 1998. http://mizar.org/JFM/Vol10/bvfunc_2.html.

[3] Konrad Raczkowski and Paweł Sadowski. Equivalence relations and classes of abstraction. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/eqrel_1.html.

[4] Andrzej Trybulec. Function domains and Frænkel operator. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/fraenkel.html.

[5] Zinaida Trybulec. Properties of subsets. *Journal of Formalized Mathematics*, 1, 1989. http://mizar.org/JFM/Vol1/subset_1.html.

[6] Edmund Woronowicz. Interpretation and satisfiability in the first order logic. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/valuat_1.html.

[7] Edmund Woronowicz. Many-argument relations. *Journal of Formalized Mathematics*, 2, 1990. http://mizar.org/JFM/Vol2/margrel1.html.

Received August 17, 1999

Published January 2, 2004