MONADIC PREDICATE FORMULAE

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SUMMARY

It may be easily to fix truthfulness value of monadic predicate formulae on the arbitrary cardinality subject domain. Because is often tested the correctness of statements reasoning, theirs premises and conclusion can be expressed through in this paper described formulae, it is very suitable to occupy with the monadic predicate formulae.

Keywords : logic formulae, predicate formulae, truths of formulae, partition, Karnaugh map

1. INTRODUCTION

The truthfulness value of arbitrary monadic predicate formulae is possible always and simple to determine, i.e. predicate formulae, in which occur only one-placed of predicate independent on the cardinality of subject domain. It is consequently suited with described formulae of predicate logic of the first order to occupy one self.

FORMULAE

It may be easily to fix truthfulness value of mondic predicate formulae on the arbitrary cardinality

Because is of the corrections of sistements reasoning, their permisses and conclusion can be experiment

Because is ope Because is often tested the correctness of statements reasoning, theirs premises and conclusion can

intis paper described formulae, it is very suitable to occupy with the monadic predicate formulae.
 Keywords: Logic fo place individual predicate p_i , i.e. $p_i : D \to \{0,1\}$: the relationship r_i . Each unary predicate $p_i(x)$ defines on the subject domain $D(x \in D)$ a dichotomy (a partition having two classes D_i^0, D_i^1) The truthmines value of arbitrary mond
of the contribution of all classes of it is trained of predicate formulae is possible always and simple to

the nermine, i.e. predicate formulae, in which occur

(is equal to) D.

Mo around value only (a mine, countable only in the conduction $P_1(x) = P_2(x) = 1$ a $p_3(x) = 0$.
 $(p_1 \subset D)$ be given on the domain D and a one-
 $p_2(x) = 1$ a $p_3(x) = 0$.
 $p_4(x) = 0$ for $x \in p_1$ and $x \mapsto 1$ for $x \in r_1$ carrie

$$
\mathcal{T}_{p_i}(D) = \left\{ D_i^{\sigma} \right\}_{\sigma \in \{0,1\}} \quad \text{such} \quad \text{that}
$$

 1 and vice versa. Twic that $\overline{0}$ 1 for $x \in D_i^1$ 0 for $x \in D_i^0$ and view years. Note the i $i(x) =\begin{cases} 0 & \text{for } x \in D_i \\ 1 & \text{for } x \in D_i^1 \end{cases}$ and vice versa. Note that as can be seen in F $p_i(x) = \begin{cases} 0 & \text{for } x \in D_i^0 \\ 0 & \text{and vice versa. Note that} \end{cases}$ as can be seen in F. for $x \in D_i^1$ for $x \in D_i^0$ and vice versa. Note that as can be seen

the nullary predicate $\{d\} \rightarrow \{0,1\}$ (d $\in D$) defines on D a monadic partition $\pi(D) = \{D\}$.

Be given a system $\{p_i(x)\}_{i=1}^m$ of unary predicates $p_i(x)$ on D. The system of predicates e_i M_m defines on D a generally incomplete partition

$$
\mathcal{T}_{p_1, p_2, \dots, p_m}(D) = \left\{ \bigcap_{i=1}^m D_i^{\sigma_i} \right\}_{\langle \sigma_1, \sigma_2, \dots, \sigma_m \rangle \in \{0, 1\}^m}
$$
\nhaving $\bigcap_{i=1}^m D_i^{\sigma_i} \mid \mathcal{T}_{p_1, p_2, \dots, p_m}(D) \mid (\leq 2^m)$ classes\nof $\bigcap_{i=1}^m D_i^{\sigma_i}$, and on each class $\bigcap_{i=1}^m D_i^{\sigma_i}$, or shortened\nFig. 1 Recurrent de

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 at to the predicates $p_i(x)$ assume a value σ_i too. The partition $\pi_{p_1, p_2, \dots, p_n}(D)$ is incomplete (complete) 1 **IULAE**

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 m the arbitrary cardinality subject domain.

and conclusion can be expressed through if the union of all classes of it is a proper subset (is equal to) D .

2. DESCRIBING OF MONADIC PREDICATE The partition is incomplete because Assume a non-empty subject domain $D(D \neq \emptyset)$ $D_1^1 D_2^1 D_3^0$ the predicates assume the values *It may be easily to fix truthfulness value of monadic prediction contain the arbitrary cardinality subject domain.

Recounse is often be expressed the correctness of statements reasoning, theirs premise and conclusion ca* **Example 1.** INTRODUCTION

The untilitions value of arbitrary monadic predicates $p_i(x)$ assume a value of too. The

The untilitions value of arbitrary monadic predicates $p_i(x)$ assume a value of too. The

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 ION Example 1.: A system, $\{p_i(x)\}\}^3_{i=1}$ of predicates pplied Sciences, Univerzitni

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sume a value σ_i too. The

is **incomplete (complete)**

of it is a proper subset
 p_i (x) $\Big|_{i=1}$ $p_i(x)$ can determine the partition $\mathcal{T}_{p_i, p_i, p_i}(D)$ = independent Search Containstandant Search Containstandant Search Containstance (complete)

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2. Evantion is a proposer an $|\pi_{p_1,p_2,p_3}(D)| = 4 \left(\langle 2^3 \rangle \right)$; on a class, e.g., , E-mail: janes@fel.evut.ez

formulae on the arbitrary cardinality subject domain.

premises and conclusion can be expressed through in

madic predicate formulae.

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the predicates $p_i(x)$ assume a v **12**

12 the formulae on the arbitrary cardinality subject domain.

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2 the predicates $p_i(x)$ assume a value σ_i too. The
 and in The predicates $p_i(x)$ assume a valu **The sum of the analytical state of the system of the system of the system of the system of the product of product** P_n **,** p_n formulae on the arbitrary cardinality subject domain.

premises and conclusion can be expressed through in

madic predicate formulae.

Artition, Karnaugh map

the predicates $p_i(x)$ assume a value σ_i too. The
 the unio *x* is call to *D.* Example 1.: A system, $\{p_i(x)\}_{i=1}^3$ of predicates $p_i(x)$ can determine the partition $\pi_{p_i, p_i, p_i}(D) =$
 $= \{p_i^0D_2^0D_3^1, D_1^1D_2^0D_3^1, D_1^1D_2^1D_3^1, D_1^1D_2^1D_3^1\}$ on *D.* The partition is i

 D_i^0, D_i^1 means of *k*-dimensional ($k = 0, 1, ..., m$) **Karnadgii**
map M_k which is recurrently defined for systems be given an the domain D and a one-
 $x_i \geq 0$ be given an symmatric answer and a one-
 $\sum_{i=1}^{n} D_i e_i$ on the domain D and a one-
 $\sum_{i=1}^{n} D_i e_i^2$ are connected by
 $x_{i-1} = \begin{cases} \frac{1}{n} D_i e_i^2 & \text{if } n \geq 0 \\ \frac{1}{n} D_i e_i^$ **width predictate** ρ , a.e. p_i : $D \rightarrow \{0, 1\}$.
 $x \neq r_i$ and $x \mapsto 1$ for $x \in r_i$, carried by
 $x \neq r_i$ and $\alpha(x \in D)$ a dictotomy
 $\{\Delta P^T\}$, Each unary predictate $p_i(x)$
 ΔP^T , Each unary predictate $p_i(x)$
 $\{\Delta P$ **calicate** *p*, i.e. *p*; *D* \rightarrow [0,1];
 $x \mapsto 1$ for $x \in r$, carried by
 $x \mapsto 1$ for $x \in r$, carried by
 $\frac{1}{2}$ are calingle or square, the incomplete as well as

domain $D(x \in D)$ a dichotomy
 $\frac{1}{2}$ or defined a rectangle or square, the incomplete as well as the complete partitions on D defined by the system of predicates on D can be conveniently depicted by means of k-dimensional $(k = 0,1,...,m)$ Karnaugh consisting of a nullary predicate - M_o , a single $p_i(x) - M_1$ predicate, and m predicates $p_i(x) - M_m$,

 $\bigcap_{i=1}^{m} D_i^{\sigma_i}$, or shortened **Fig. 1** Recurrent definition of Karnaugh map M_k

Example 2.: Depict the incomplete partition D from Example 1 using a Karnaugh map M_3 – Fig. 2.

Fig. 2 Incomplete partition D from Example 2

Let the formula of the first-order predicate logic comprising only unary predicates over the domain D be called a *monadic predicate formula*, e.g., $\forall x p(x)$ $\Rightarrow \exists x \ p(x)$. Each monadic predicate formula over the domain D comprising m different unary predicates $p_i(x)$ (i =1,2,...,m) is apparently satisfiable in D $p(x)$ $\forall x$ only and only if it is satisfiable in the classes of the incomplete partition $\pi_{p_1, p_2, ..., p_m}(D)$ [2]. On the $\frac{P_2(x)}{\frac{1}{3} \left| \frac{1}{2} \right| P_1 P_2 P_3}$

Where $\left| = \text{ means } \int_0^x b \sin \theta \cos \theta'$, on the other

hand because $\pi_p(D) = \{ \delta_1, \delta_2 \}$, we obtain
 $\left| = p(\delta_1) p(\delta_2) \Rightarrow p(\delta_1) \vee p(\delta_2) =$
 $= \overline{p(\delta_1)} \vee \overline{p(\delta_2)} \vee p(\delta_1) \vee p(\delta_2)$, other hand, it is a tautology if and only if it is satifiable on all classes of the complete partition $\begin{array}{llll}\n & \text{where } \mid = \text{ means }, \text{do be a} \\
 & \text{hand because } \pi_p(D) = \{\delta_1, \gamma \} \\
 & \text{and because } \pi_p(D) = \{\delta_1, \gamma \} \\
 & \text{in } \Gamma(\delta_1) \text{ is a tautology if and because } \pi_p(D) = \{\delta_1, \gamma \} \\
 & \text{and because } \pi_p(D) = \{\delta_1, \gamma \} \\
 & \text{if } \Gamma(\delta_2) = \text{ is a tautology.}\n\end{array}$ $\frac{D_1^0 D_2^0 D_3^1}{D_1^1 D_2^1 D_3^1 D_1^1 D_2^1 D_3^0}$ where \models means ,*to be a tat*

hand because *π*_p(*D*) = { $δ_1, δ_2$
 $P_1(x) = p(δ_1) p(δ_2) \Rightarrow p(δ_$ g. 2 Incomplete partition D from Example 2
 $\mathbf{r} \times (\mathbf{p}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x))$
 $= \forall x (\mathbf{p}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x))$
 $= \forall x (\mathbf{p}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x)) \times (\mathbf{r}(x))$
 $\mathbf{$ Fig. 2 Incomplete partition *D* from Example 2
 $\forall x \ (p(x)q(x)) \rightarrow (\exists x p(x)) q(x)$

Let the formula of the first-order predicate logic
 $\forall x \ (p(x)q(x)) \rightarrow (\exists x p(x)) q(x)$

mprising only unary predicates over the domain *D*

called a *mondaic*

 $\alpha \left(P(\omega_2) \vee q(\omega_2) \vee P(\omega_1) \right)$

 $n \le 2^m$, then $\forall x \ p_i(x) = \mathop{\mathcal{X}\!\!\!\!C}_{j=1}^n p_i(\delta_j)$ and $\mathop{\mathcal{X}\!\!\!\!C}_{p}(\delta_3) \vee q(x)$

 $f(x) = \bigvee_{j=1}^{n} p_i \left(\delta_j \right)$. In the Karnaugh map we will mark $\forall x p_i(x)$ by hatching all squares of p_i (d) and $\exists x \, p_i(x)$ by griddling all squares of p_i (d) [3]. Instead of inconvenient griddling we can p_l $\left(x \right)$ place a single dot in the particular square of the map.

The monadic predicate formula P appears to be a tautology if its general closure is a tautology, e.g., if $u_1 \forall u_2...\forall u_l P$ is a tautology, in case that u_k ($k =$ and c) a general closure $(1, 2,...,l)$ are all different free variables in the formula P . On the other hand the formula P is a tautology if the each square of its Karnaugh map is griddling or includes a dot too. $n \le 2^m$, then $\forall x p_i(x) = \frac{\beta}{\sqrt{2}} p_i(\delta_j)$ and $\alpha \left(P(\delta_3) \vee p(\delta_1) \vee p(\delta_2) \vee p(\delta_3) \vee p(\delta_4) \vee p(\delta_5) \vee p(\delta_6) \vee p(\delta_7) \vee p(\delta_8) \vee p(\delta_9) \vee p(\delta_9)$ B x p₍ x) = $\int_{y=1}^{x} p_{x}(\chi) = \int_{y=1}^{x} p_{y}(\chi)$ (δ₁) v p(δ₁) v p(δ₁) v p(δ₁) v p(δ₂) and $\exists x \ p_i(x)$ by grotaning all squares of

single dot in the particular square of the map.

single dot in the particular square of the map.
 $\frac{1}{2}$ is general closure is a tautology, e.g., if
 $\frac{1}{2}$ is general clo

Example 3.: Determine both by formally and mapping procedures if the formulae below are tautologies (\Rightarrow) is the implication operator):

a)
$$
\forall x \ p(x) \Rightarrow \exists x \ p(x)
$$
,
\nb) $p(x)q(x) \Rightarrow (\exists x \ p(x))q(x)$,
\nc) $p(x)q(x) \Rightarrow (\forall x \ p(x))q(x)$
\n& (

and a) on the one hand
\n
$$
\models \forall x \ p(x) \Rightarrow \exists x \ p(x) = \overline{\forall x} \ p(x) \lor \exists x \ p(x) =
$$
\nwhich is not a tautolo
\nthe way in which the
\nvery conjuging:

where $=$ means $, to be a tautology$, on the other hand because $\pi_p(D) = \{\delta_1, \delta_2\}$, we obtain

$$
\varphi = p(\delta_1) p(\delta_2) \Rightarrow p(\delta_1) \vee p(\delta_2) =
$$

= $\overline{p(\delta_1)} \vee \overline{p(\delta_2)} \vee p(\delta_1) \vee p(\delta_2),$

ad b) a general closure of the given formula is $\forall x \ (p(x)q(x) \Rightarrow (\exists x \ p(x))q(x)) =$ $=\forall x \left(\overline{p(x)} \vee \overline{q(x)} \vee \exists x \ p(x)\right)$ $=\forall x \left(\overline{p(x)} \vee \overline{q(x)} \vee (\exists x \ p(x)) \ q(x) \right) =$

 $\frac{D_2^0 D_3^1 D_1^1 D_2^1 D_1^1 D_2^1 D_3^0}{\sqrt{x}}$
 $= p(\delta_1) p(\delta_2) \Rightarrow p(\delta_1) \vee p(\delta_2) =$
 $= p(\delta_1) \vee p(\delta_2) \Rightarrow p(\delta_1) \vee p(\delta_2) =$

antition D from Example 2

partition D from Example 2
 $\sqrt{x} (p(x) q(x)) \leq (\exists x p(x) q(x) | x(x)) =$
 $= \sqrt{x} (p(x) \vee q$ $n \qquad \qquad \frac{1}{1}$ $\frac{D_2^2 D_3^2 D_1^3 D_1^1 D_2^1 D_3^1 D_1^1 D_2^1 D_3^0}{\frac{1}{2}(\lambda)} = \frac{P(\delta_1) P(\delta_2) - P(\delta_1) P(\delta_2)}{P(\delta_1) \vee P(\delta_2)}$

and b) a general closure of the given formula is

partition *D* from Example 2
 $\frac{\forall x \ (P(x) q(x) = (\exists x p(x)) q(x)]}{\sqrt{x} \ (x)$ $D = \{\delta_j\}_{i=1}^{\infty}$, where $\& (\overline{p(\delta_2)} \vee \overline{q(\delta_2)} \vee p(\delta_1) \vee p(\delta_2) \vee p(\delta_3) \vee p(\delta_4)) \&$ $\mathcal{L}_{1}^{L} p_{i} (\delta_{j})$ and $\mathcal{L}_{R} (\overline{p(\delta_{4})} \vee \overline{q(\delta_{4})} \vee p(\delta_{1}) \vee p(\delta_{2}) \vee p(\delta_{3}) \vee p(\delta_{4}))$ Fig. 1.1 and b) a general closure of the given formula is

itition *D* from Example 2
 $\forall x \ (p(x)q(x) = (3x) p(x)q(x)) = x(x) p(x)q(x)$

E first-order predicate logic $\forall x \ (p(x)q(x) = x(p(x))q(x)) = y(x)q(x)$
 $\Rightarrow \forall x (p(x) \lor q(x) \lor q(x) \lor x p(x)) q(x)$

predic x p = P(0₁) V P(0₂) V P(0₂) V P(0₂).

ad b) a general closure of the given formula is

x (p(x)q(x)=(x)x p(x))q(x)=

the first-order predicate logical

the first-order predicate logical
 $\forall x$ (p(x)q(x) = (x)x q(and because $\pi_{p,q}(D) = \{\delta_j\}_{j=1}^4$, we obtain where $\rvert = \text{ means } y, b \text{ be } a \text{ tautology } \text{''}$, on the other
hand because $\pi_p(D) = \{\delta_1, \delta_2\}$, we obtain
 $\rvert = p(\delta_1) p(\delta_2) \Rightarrow p(\delta_1) \vee p(\delta_2) =$
 $\overline{p(\delta_1)} \vee \overline{p(\delta_2)} \vee p(\delta_1) \vee p(\delta_2)$,
ad b) a general closure of the given formul = $p(\delta_1) p(\delta_2) \Rightarrow p(\delta_1) \vee p(\delta_2) =$

= $p(\delta_1) \vee p(\delta_2) \vee p(\delta_1) \vee p(\delta_2)$,

ad b) a general closure of the given formula is
 $\forall x \ (p(x)q(x) \Rightarrow (\exists x p(x) q(x)) =$

= $\forall x (p(x) \vee q(x) \vee (\exists x p(x) q(x)) =$

= $\forall x (p(x) \vee q(x) \vee \exists x p(x)$
 $\forall x (x)$
 and by a general closure of the given formula is
 $\forall x \ (p(x)q(x)) \leq (3x p(x)) q(x) =$
 $\Rightarrow \forall x (p(x)q(x)) \leq (3x p(x)) q(x) =$
 $\Rightarrow \forall x (p(x) \lor q(x) \lor (3x p(x)) q(x) =$
 $\Rightarrow \forall x (p(x) \lor q(x) \lor 3x p(x))$
 $\Rightarrow \forall x (p(x) \lor q(x) \lor 3x p(x) =$
 $\Rightarrow p(x)$
 $\Rightarrow p(x)$
 $\Rightarrow p(x)$
 $\Rightarrow p$ $\begin{align*}\n\begin{aligned}\n\langle \overline{\mathbf{y}} \rangle \rangle &p \left(\delta_1 \right) \vee p \left(\delta_2 \right) \vee p \left(\delta_3 \right) \vee p \left(\delta_4 \right) \rangle \&\n\end{aligned}\n\end{align*}$ $\begin{align*}\n\langle \overline{\mathbf{y}} \rangle \rangle &p \left(\delta_1 \right) \vee p \left(\delta_2 \right) \vee p \left(\delta_3 \right) \vee p \left(\delta_4 \right) \rangle \&\n\end{align*}$ $\langle \overline{\mathbf{y}} \rangle \rangle &p \left(\delta_1 \right$

ad c) a general closure of the given formula is $\forall x (p(x)q(x) \Rightarrow \forall x p(x)q(x)) =$

$$
= \forall x \left(\overline{p(x)} \vee \overline{q(x)} \vee \forall x \ p(x) q(x) \right) =
$$

= $\forall x \left(\overline{p(x)} \vee \overline{q(x)} \vee \forall x \ p(x) \right)$
and because $\overline{\mathcal{H}}_{pq}(D) = \{ \delta_i \}_{i=1}^4$ we obtain

 $4 \qquad \qquad \bullet$ $(D) = \left\{ \delta_j \right\}_{j=1}$ we obtain

$$
\frac{\left(\overline{p(\delta_1)}\vee \overline{q(\delta_1)}\vee \overline{p(\delta_1)}\right)\overline{p(\delta_2)}\overline{p(\delta_3)}\overline{p(\delta_4)}\right) \&}{\mathcal{R}\left(\overline{p(\delta_2)}\vee \overline{q(\delta_2)}\vee \overline{p(\delta_1)}\overline{p(\delta_2)}\overline{p(\delta_3)}\overline{p(\delta_4)}\right) \&}
$$
\n
$$
\frac{\mathcal{R}\left(\overline{p(\delta_3)}\vee \overline{q(\delta_3)}\vee \overline{p(\delta_1)}\overline{p(\delta_2)}\overline{p(\delta_3)}\overline{p(\delta_4)}\right) \&}
$$
\n
$$
\frac{\mathcal{R}\left(\overline{p(\delta_4)}\vee \overline{q(\delta_4)}\vee \overline{p(\delta_1)}\overline{p(\delta_2)}\overline{p(\delta_3)}\overline{p(\delta_4)}\right)}{\mathcal{R}\left(\overline{p(\delta_4)}\vee \overline{q(\delta_4)}\vee \overline{p(\delta_1)}\overline{p(\delta_2)}\overline{p(\delta_3)}\overline{p(\delta_4)}\right)}
$$

which is not a tautology, and more over, because of the way in which the formula is organized it is not very convincing:

Karnaugh maps can be conveniently applied for examining correctness of statements reasoning, in $p(x)$ case the premises and conclusions are monadic predicate formulae over D , are since if Horn's reasoning p_1 , p_2 , p_m \neq *is given*, where p_i (i =1,2,...,*m*) premises, q is the conclusion, and \models is the sign of inferring, then $p_1, p_2, ..., p_m \models q$, if and only if Etrotechnica et Informatica No. 4, Vol. 4, 2004
 $\frac{1}{2}\pi(r(x)q(x))\exists x (p(x)r(x)]\exists x (q(x))$
 $\pi(r(x))\exists x (p(x)r(x))\exists x (q(x))$
 $\pi(r(x))$

augh maps can be conveniently applied for
 a contradiction:
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that is, state mapping whether the formula
 $\frac{1}{2}x(p(x)y(x))\exists x(p(x)r(x))\exists x(y(x)r(x))$ is a

contradiction:

Karnaugh maps can be conveniently applied for

examining cor that is, state mapping whether the
 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ (x) $\frac{1}{2}$ (x) (x) $\frac{1}{2}$ (x) (x) $\frac{1}{2$ that is, state mapping whether the formula
 $p(x) = p(x) + p(x) + q(x)$ and $p(x) = p(x) + q(x) + q(x) + q(x)$ and $p(x) = p(x) + q(x) + q(x) + q(x)$

maugh maps can be conveniently applied for

in g correctness of statements reasoning, in

the premises and $p(x)$
 $p(x)$

\n $(\models \bigotimes_{i=1}^{m} p_i \Rightarrow q) = (\models \bigotimes_{i=1}^{m} p_i \vee q) =$ \n	\n Authors believe, that the decision values of monadic predicate for Kanaugh maps is very simple.\n
\n $(\models \bigvee_{i=1}^{m} \overline{p_i} \vee q) (p_1, p_2, \ldots, p_m \not\iff q, \text{ if and only if}$ \n	\n RETERENCES\n
\n $(\models \bigvee_{i=1}^{m} \overline{p_i} \vee q) (p_1, p_2, \ldots, p_m \not\iff q, \text{ if and only if}$ \n	\n RETERENCES\n
\n $(\models \bigvee_{i=1}^{m} \overline{p_i} \vee q) (p_1, p_2, \ldots, p_m \not\iff q, \text{ if and only if}$ \n	\n RETERENCES\n
\n $(\models \bigvee_{i=1}^{m} \overline{p_i} \vee q) (p_1, p_2, \ldots, p_m \not\iff q, \text{ if and only if}$ \n	\n RIFERENCES\n
\n $(\models \bigvee_{i=1}^{m} \overline{p_i} \vee q) (p_1, p_2, \ldots, p_m \not\iff q, \text{ if and only if}$ \n	\n RIFERENCES\n
\n $(\exists \bigvee_{i=1}^{m} \overline{p_i} \Rightarrow q) = (\exists \bigvee_{i=1}^{m} \overline{p_i} \vee q) (p_1, p_2, \ldots, p_m \not\iff q, \text{ if and only if}$ \n	\n RIFERENCES\n

means ϕ *to be contradictory to*".

We introduce that all general reasoning p_1 , $p_2,...,p_m \models q_1, q_2, ..., q_n$ can be expressed as sequence of Horn's reasoning $p_1, p_2, ..., p_m \models q_i$ (j $= 1, 2, \ldots, n$).

Example 4.: Decide about the correctness of the reasoning $(4 \lambda + 1)$

$$
\frac{\exists x (p(x)q(x))}{\forall x (p(x) \Rightarrow r(x))}
$$

that is, state mapping whether the formula

$$
\overline{\exists x} (p(x)q(x)) \vee \overline{\forall x} (p(x) \Rightarrow r(x)) \vee \vee \exists x (q(x)r(x)) = \n= \forall x (p(x) \vee \overline{q(x)}) \vee \exists x (p(x) \overline{r(x)}) \vee \exists x (q(x)r(x))
$$

is or is not a tautology:

The above formula is a tautology and the reasoning is correct.

Examle 5.: Verify the correctness of the reasoning $\exists x (p(x)q(x))$ $\exists x (\rho(x) r(x))$ $\overline{\exists x}$ $\left(q(x)r(x)\right)$

that is, state mapping whether the formula $\exists x (\rho(x) q(x)) \exists x (\rho(x) r(x)) \exists x (q(x) r(x))$ is a contradiction:

 argument is not correct. The given formula is not a contradiction and the

3. CONCLUSIONS

1 Karnaugh maps is very simple. Authors believe, that the decision of truthfulness
 $\mathbf{\mathcal{X}}_{p_i \vee q}$ = values of monadic predicate formulae through Authors believe, that the decision of truthfulness

- $\overset{m}{\mathcal{X}} p_i \overset{-}{q}$ [4], where $=$ [1] Frištacký, N. and another: Logic System. ALFA-
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BIOGRAPHY

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