Many-Valued Protothetic
Bolesław Sobociński

The Fifth International Symposium on Multiple-Valued Logic was held at Indiana University on May 13–16, 1975. On the evening of May 14, Sobociński presented a one-hour lecture and these notes are in a file dealing with that meeting.

The first six pages are the sort of notes that one would make in preparation for a talk. They lack detail, yet are quite informative. The next nine pages are very sketchy, clearly work in progress.

Sobociński returned to this topic in the Spring of 1965 in a course entitled “Advanced Calculus of Propositions” (Phil 278). See Rickey’s notes for that course, pp. 216–296. This is active research.

Some documents about the meeting are included.

Sobociński never published on this topic.

Summary prepared by V. Frederick Rickey, July 3, 2018
Many-valued protothetic.

1. Protothetic of Heyting, $\Pi \lor \lor \Theta$ first theory:
Protothetic - $n$-valued propositional calculus generalized by
introducing $n$ t-relevant quantifiers and the variable function into its
field.

Remark: arguments and quantifiers: $\sim \forall \exists p \in [0,1] a.s.o.$

A term quantificational category in protothetic? $p \sim q a.s.o.$

It was known to Russell that:

$F \sim p = \wedge q$. Hence, full implicational calculus with t-relevant quantifiers contains
$n$-valued propositional calculus.

We have 4 and only 4 quantifiers for the propositional argument, viz
$\sim \Delta$, $\forall \exists$. For quantifiers, $\forall \exists$ protothetic we even have a
variable, say $n$, which belong to the same semantic category as
$\sim \Delta$. Similarly, we can introduce a variable $p$ belonging to the same
semantic category as $\forall \exists$, a.s.o.

The addition of variable quantifiers to $p$. calculus allows us
1) to define (Tarski)'s ''and'' by $\equiv$, viz.

$[p\&q] :: p \& q \equiv [4] : f(p) \equiv f(q) \equiv q$ (different forms)

2) to prove that the formulas (Tarski):

1) $[p\&q] :: p \equiv q \equiv [4] : f(p) \equiv f(q)$ (law of extensionality)

and

2) $[4 \& q] : f(0) \lor f(1) > f(p)$ (the principle of bivalence)

are interpratatively equivalent in the field of classical logic.
Moreover, we have:

1) $[\phi_1 \land \phi_2, \phi_3, \phi_4] \equiv \phi_1 \land \phi_2 \land \phi_3 \land \phi_4$.
2) $[\phi_{i+1}] : \phi_1 \equiv \phi_{i+1} \land \phi_{i+1}$.

And the same holds for arbitrary expressions of any higher semantical category. Thus, for $f(x,y)$ we have:

Bisimulation can be axiomatized be based on different primitive notions,

e.g. on implication only. In such a case, it is sufficient to assume

axiomatically a small fragment of implicational calculus and

formula $[A(B, C), \neg C, \neg B, \neg A] \Rightarrow \phi(B, C) \equiv \phi(B, C)$.

But, for several reasons, Löbmannske accepted as a primitive notion $\equiv$.

The shorter single axiom (9, 1945) is:

$A [\phi, \psi] : \phi \equiv \psi \equiv \phi(\psi) \equiv \phi(\psi)$.

And five rules of procedure:

1. Definitions: $[\phi_1, \ldots, \phi_n] \equiv \phi_1(\phi_2, \ldots, \phi_n)$.
2. Rule of distribution of quantifiers.
   - There are no vacuous quantifiers. No particular quantifier.
3. Rule of detachment: $\neg \neg A \equiv B$ and $\neg \neg A$, then $B$.
4. Rule of substitution: No use of incomplete symbols.
5. Rule of extensionality: (except extensionality of propositions).

Remark: No theorem of protothetic has the free variables.
3

It is proved that
1) \( \text{Prototetic is a consistent system.} \)
2) \( \text{It is functionally complete and} \)
3) \( \text{Prototetic is strongly complete system in the sense that if A is} \)
well-formed formula \( B \) without free variables in the field of prototetic and
\( A \) does not possess the free variables, then either \( A \) or \( \neg A \) is a consequence
of axiom \( A \).

Moreover, although we have only the rule concerning the distribution of
quantifiers, any formula concerning the use of quantifiers is provable
as a theorem of a system. E.g., we have:

\[ \{ p \} \vdash p \quad \{ p \} \vdash \neg p \quad \{ p \} \vdash \neg \neg p \quad \{ p \} \vdash \neg \neg \neg p \]

It can be easily proved that if \( \phi(x) \) is a propositional function belonging
to a theory based on prototetic, then no matter to what thing of type \( \phi(x) \)
belong \( p \) and \( x \) belong, we have all quantification theory for \( \forall x \) a.s.o.

This superficial description of prototetic shows that this system is so involved as
possible. A problem which I like to discuss here is a construction of possibility
of a combination of many-valued prototetic. At one we can remark that
there is no infinite-valued propositional system which can be could be
considered as prototetical system, since infinite-valued systems cannot
be obviously functionally complete. On the other hand, for any natural
number \( n \) we are able to construct \( n \)-valued prototetical system.

The main difference between prototetic and many-valued prototetical
systems is that the principle of bivalence and law of extemality
is false in the latter systems, and in the field of such systems
we have no principle of bivalence, but the principles \( \neg \neg p \)-valency,
\( \vdash \phi(x) \vdash \phi(2) > \phi(3) > \phi(4) \)
In order to understand a method which allows us to construct for the given \( n \), \( n \)-valued prototetic we have to analyse another formalization of the \( n \)-valued prototetic, i.e., the so called, computable prototetic. Viz. System 15

Axiom: C00

Rules:

1. If \( \alpha \) and \( \beta \) are already theses of the system, then \( \mathcal{C} \alpha \beta \) is also.
2. If \( \alpha \) and \( \mathcal{C} \alpha \beta \) belong to the system, then \( \mathcal{C} \alpha \mathcal{C} \alpha \beta \) is also.
3. If \( \mathcal{C} \alpha \beta \) and \( \mathcal{C} \beta \gamma \) belong to the system, then \( \mathcal{C} \alpha \gamma \) is also.
4. If \( \mathcal{C} \alpha \beta \) and \( \mathcal{C} \beta \gamma \) belong to the system, then \( \mathcal{C} \beta \gamma \) is also.

Universal rules:

\[
\begin{array}{ccc}
\mathcal{C} & \mid & 0 \quad 1 \\
0 & 1 & 1 \\
1 & 0 & 1 \\
\end{array}
\]

System:

\[
\begin{align*}
\mathcal{C} \beta \beta & = 1, \quad \beta = 0 \\
\mathcal{C} \alpha \beta & = 0
\end{align*}
\]

describe matrix:

\[
\begin{array}{ccc}
\mathcal{C} & \mid & 0 \quad 1 \\
0 & 1 & 1 \\
1 & 0 & 1 \\
\end{array}
\]

e) \( \mathcal{C} \mathcal{C} \alpha \beta \mathcal{C} \beta 200 \quad \alpha \) defining, \( \beta \) definendum.

f) If defining \( \beta \) is given (or substitute instance) belongs to the system, then also \( \alpha \) definendum (or its corresponding instance) can be added to the system.

g) \( \mathcal{C} \beta \beta \), then also \( \mathcal{C} \beta \beta \) (analogous to f)

h) If the given semantic category \( \alpha \) \( \beta \) we have \( n \) constants (e.g., for \( f(x) \) \( 4 = 1, 7, 6, \alpha \), \( \beta \) and in the system we have already \( n \) proven theses: \( A(x_1), A(x_2), \ldots, A(x_n) \), then we can add a thesis \( \mathcal{C} \alpha \mathcal{C} \alpha \beta \mathcal{C} \beta \beta \).

Thus e.g. in \( \mathcal{C} \alpha \) \( \beta = 0 \), define \( \beta = \mathcal{C} \alpha \beta \), prove \( \mathcal{C} \alpha \beta \), then

\[
\mathcal{C} \gamma \mathcal{C} \beta \beta
\]

i) If \( \alpha \) begins with universal quantifier, \( \beta \) can be obtain from \( \alpha \) by substitution of the constant, constant for its variables, \( \mathcal{C} \beta \beta \), theorem.
It can be proved that systems A and B are inferentially equivalent, and moreover, the proof $A \to B$ gives the completeness proof, and $B \to A$ a consistency proof.

Similarly, we can construct systems for $\equiv$ and several other functions.

The computable systems of prototactic give a hint how we can construct $n$-valued prototactic. Namely, in order to obtain $n$-valued prototactic we have to choose $n$-valued matrices which are functionally complete. Then, we define the rules analogous to Leśniewski's rules discussed above, but based on the matrix and we accept an analogous axiom, say $C \equiv \lambda$, where $\lambda$ is a constant.

But in order to formalize such systems we have to modify considerably Leśniewski's approach. Namely, we consider for any natural $n$, there are $n-1$ functionally complete different propositional systems. Let us consider a matrix:

$$
\begin{array}{cccc}
\text{C} & \text{1} & \text{2} & \text{3} & \text{H} \\
\text{1} & 3 & 2 & 3 & 2 \\
\text{2} & 1 & 3 & 3 & 3 \\
\text{3} & 1 & 2 & 3 & 1 \\
\end{array}
$$

This matrix is functionally complete, but using it we can also obtain two systems, viz. accepting that 3 and 5 are designated values or only one $\equiv$ (cf. Łukasiewicz–Tarski). In order to obtain this two systems, we have to accept 8 rules analogous to rules a–e, and several rules 2 rules analogous to rule of defining and several rules replacing the rule $H$ and i, and in addition the rules concerning functor $H$ according to whether we like to obtain stronger or weaker systems. About these systems we can prove that the $H$ system, that it possesses the properties similar to ordinary prototactic. Finally, we can even formulate such systems in the ordinary way.
Similarly, we can obtain for arbitrary \( n \), \( n \)-valued protoalgebras. The proof that it holds for any natural \( n \) is rather involved. Dr. T. Marshall constructed the algebraic systems analogous to such protoalgebraic calculi.
64. \( p \lor 0 \equiv \{10, 52\} \)

65. \( p \lor \neg p \equiv \{69, 9, 34\} \)

66. \( p \lor 0 \equiv \{38, 10\} \)

67. \( p \lor q \equiv \{66, 9, 34\} \)

68. \( p \lor \neg q \equiv \{69, 9, 34\} \)

69. \( p \lor q \equiv p \lor \neg q \equiv \{68, 11, 34\} \)

70. \( p \lor (p \land q) \equiv \{69, 9, 34\} \)

71. \( \neg (p \lor q) \lor q \equiv \{70, 14, 34\} \)

72. \( \neg (p \lor q) \lor (\neg q) \equiv \{71, 14, 34\} \)

73. \( \neg p \lor q \equiv \{35, 9, 34\} \)

74. \( \neg p \lor q \equiv \{65 \lor q, 34, 34\} \)

75. \( p \lor q \equiv \{62, 12, 74\} \)

76. \( p \lor q \equiv p \lor q \equiv \{65, 61, 62\} \)

77. \( p \equiv q \lor p \lor q \equiv p \equiv q \equiv \{69, 52, 54\} \)

78. \( p \equiv q \equiv p \lor q \lor \neg q \equiv \{62, 96, 77\} \)

79. \( p \equiv 1 \lor p \equiv \{87, 34\} \)

80. \( \forall x : [\forall x] : 1 \lor f(x) \equiv 1 \lor [\forall x] \cdot f(x) \equiv \{79, 5\} \)

81. \( \forall x : [\forall x] : 0 \lor f(x) \equiv 0 \lor [\forall x] \cdot f(x) \equiv \{11, 5\} \)

82. \( \exists x : [\exists x] : p \lor f(x) \equiv p \lor [\exists x] \cdot f(x) \equiv \{80, 81, 34\} \)

83. \( [f(x)] : [f(x)] : f(x) \equiv f(x) \equiv \exists x : [\exists x] \cdot f(x) \)

84. \( [f] : f(0) \equiv f(0) \equiv 0 \equiv \{83, 83, 8, 6\} \)

85. \( [f] : f(1) \equiv f(0) \equiv 0 \equiv 0 \equiv \{83, 88, 8, 6\} \)

86. \( [f] : f(n) \equiv f(n) \equiv n \equiv n \equiv \{84, 85, 73, 8, 6\} \)
11. \Pi_1 \Gamma_{\frac{1}{2}} [10; 21]
12. \Phi(\Pi_{\frac{1}{2}} \Gamma_{\frac{1}{2}}) [10; 21]
13. \Pi_1 \Gamma_{\frac{1}{2}} [12; 22]
14. \chi(\Pi_{\frac{1}{2}} \Gamma_{\frac{1}{2}}) [3; 21]
15. \eta(\Pi_{\frac{1}{2}} \Gamma_{\frac{1}{2}}) [14; 21]
16. \eta(\Pi_{\frac{1}{2}} \Pi_{\frac{1}{2}}) [215 i analognuyx form]

Доказываем конику перпендикуляр:

1. ССРРССРРССР
2. ССРРССРРССРРССР
3. ССРРССРРССРРССР
4. ССРРССРРССРРССР
5. ССРРССРРССРРССР
6. ССРРССРРССРРССР
7. ССРРССРРССРРССР
8. ССРРССРРССРРССР
9. ССРРССРРССРРССР
10. ССРРССРРССРРССР
11. ССРРССРРССРРССР
12. ССРРССРРССРРССР
13. ССРРССРРССРРССР
14. ССРРССРРССРРССР
15. ССРРССРРССРРССР
16. ССРРССРРССРРССР
17. ССРРССРРССРРССР
18. ССРРССРРССРРССР
19. ССРРССРРССРРССР
20. ССРРССРРССРРССР

Утверждаем доказательство:

1) 0 = [\Pi_1 ; \eta]
2) 1 = C00 = \Pi_1 \Pi_1 \Pi_1
3) \frac{1}{2} = [\Pi_1 ; \Pi_1 ; \Pi_1 \cdot \eta = [\Pi_1 ; 0] \cdot \eta
4) H_1 = [\Pi_1 ; f(y) \cdot \Pi_1 \cdot f(y)]
\[ \tau_{10} = \text{C} \text{H}_3 \text{N} \text{C}_2 \mu \frac{1}{2} \sqrt{\frac{V}{\mu}}. \]

\[ \tau_{20} = \text{H} \text{C} \text{H}_2 \text{N} \text{H} \text{H} \mu \frac{1}{2} \sqrt{\frac{0}{\mu}}. \]

\[ e_{11} = \text{H} \text{C} \text{H}_2 \mu \text{H} \text{C} \text{H}_2 \mu \text{C} \text{H} \mu. \]

\[ N_{1} = \text{C} \text{C}_2 \mu \text{H} \text{H} \text{M} \mu. \]

\[ \text{C} \text{H}_3 \text{C} \text{H}_3 \text{N} \text{H} \text{H} \text{N} \text{H} \mu. \]

\[ \text{C} \text{H}_3 \text{N} \text{H} \text{M} \mu. \]

\[ e \text{C} \text{H}_3 \text{M} \text{H} \text{N} \text{H} \mu. \]

\[ e \text{C} \text{H}_3 \text{N} \text{H} \text{N} \text{H} \mu. \]
\[ F_1 = HCP_{11} = EC_{111} \]
\[ F_2 = HHe_{2} \]
\[ F_3 = He_{2}He_{2} \]
\[ F_4 = CH_{11} \]
\[ F_5 = H_{11} \]
\[ F_6 = \mu = A_4(C_3) \]
\[ F_7 = \alpha_{12} \]
\[ F_8 = He_{11} \]
\[ F_9 = EC_{111} = C_{2} \]
\[ F_{10} = HHe_{11} = EC_{111} \]
\[ F_{11} = H_{11}HH_{11} = HH_{11}C_{11}2 \]
\[ F_{12} = \]
\[ F_{13} = He_{2} \]
\[ F_{14} = He_{2}HH_{11} \]
\[ F_{15} = H_{11} HH_{11} \]
\[ F_{16} = C_{112} \]
\[ F_{17} = HEC_{11} \]
\[ F_{18} = HHe_{11} \]
\[ F_{19} = C_{11} \]
\[ F_{20} = HHH_{1} \]
\[ F_{21} = HE_{11} \]
\[ F_{22} = HEC_{11} \]
\[ F_{23} = EC_{111} \]
\[ F_{24} = EC_{111}2 \]
\[ F_{25} = HH_{11}EC_{111} = HH_{11}C_{11}2 \]
\[ A_1 \eta = e_0 \eta \eta \]

\[ F_3 \eta = \text{He}_1 \eta \]

\[ F_1 \eta = e_1 \eta \]

\[ F_2 \eta = \text{He}_2 \eta \]

\[ V_1 \eta \eta = V_1 F_3 \eta F_3 \eta \]

\[ V_2 \eta \eta = V_2 F_2 \eta F_2 \eta \]

\[ V_3 \eta \eta = V_3 \eta \eta \]

\[ V_4 \eta \eta = V_4 \eta \eta \]
The 1975 INTERNATIONAL SYMPOSIUM ON MULTIPLE-VALUED LOGIC continues to bring together those having interests related to the theory and applications of multiple-valued logic. This ADVANCE PROGRAM provides an early schedule indicating the variety of interest areas for papers and some of the distinguished participants from different countries. This FIFTH ANNUAL SYMPOSIUM is supported by the following organizations: ACM, IEEE Computer Society, Society for Exact Philosophy, U.S. Office of Naval Research.

Tuesday, May 13, evening
- Registration

Wednesday, May 14, morning
- Welcome to Indiana University
- Welcome Address by the President of the International Society and Organizing Group for Multiple-Valued Logic: G. Epstein (IU, USA)
- CHAIRMAN: L. Zadeh (UCB, USA)
- Invited Address: R. Bellman (USC, USA), Local Logics
- CHAIRMAN: E. Santos (Youngstown SU, USA)
  1. G. Giles (Queen’s U, CAN), Lukasiewicz logic and fuzzy set theory
  2. D. Rine (IIT, USA), Associative and multi-valued logic techniques to improve some X-ray image processing
  3. H. Wechsler (UCI, USA), Applications of fuzzy logic to medical diagnosis
  4. Y. Moa and F. Mehr (IIT, USA), Distributed associative memory for patterns
  5. F. Schotch (Dalhousie U, CAN), Fuzzy modal logic

Wednesday, May 14, afternoon
- CHAIRMAN: P. Halmos (IU, USA)
- Invited Address: P. Dwinger (U. III, Chicago, USA), Recent developments in the theory of Post algebras
- CHAIRMAN: M. Allen (UNCC, USA)
  1. E. DuCase (CUNY, USA), Reducibility of Post functions
  2. R. Cignoli (U. III, Chicago, USA), Free non-symmetric n-valued Lukasiewicz algebras
  3. J. Loader (Brighton Polytechnic, ENGL), Second order and higher order universal decision elements in n-valued logic
  4. G. Malinowski (Lozdo, POL), Matrix representation for the dual counterparts of Lukasiewicz n-valued sentential calculus and the problem of their degrees of maximality
  5. S. Hu (Cleveland SU, USA), A ternary algebra for probability computation of digital circuits

Thursday, May 15, evening
- Banquet

Friday, May 16, morning
- CHAIRMAN: A. Tarski (UCB, USA)
- Invited Address: H. Rasiowa (U. Warsaw, POL), Multiple-valued algorithmic logics as a tool to investigate programs
- CHAIRMAN: T. Traczyk (Warsaw Tech., U. POL)
  1. R. Grigolia (Tbilisi U, USSR), On the algebras corresponding to the n-valued Lukasiewicz-Tarski logical systems
  2. I. Rosenberg (U. Montreal, CAN), Functionally complete algebras in homogeneous multiple-valued logics
  3. R. Wojciech (Wrocław, U. POL), A theorem on the finiteness of the degree of maximality of the n-valued Lukasiewicz logic
  4. J. Nazaara & C. Moraga (U. Chile, Santiago, CHILE & U. Santa Maria, CHILE), Bilinear separation of ternary functions
  5. J. Kubiński & A. Wronski (Jagiellonian U., Krakow, POL), On equivalent algebras
  6. B. Matulal (U. Tokyo, CAN), On the Noya-Nyaya logic of property and location
  7. D. Ulrich (Purdue U, USA), Many-valued logics with non-many-valued extensions—two examples

Friday, May 16, afternoon
- CHAIRMAN: B. Sobociński (Notre Dame U, USA)
- Invited Address and Welcome by the President of the Society for Exact Philosophy to its Annual Meeting: N. Belnap, Jr. (U. Pittsburgh, USA), A useful four-valued logic
- CHAIRMAN: S. Surma (Jagiellonian U., Cracow, POL)
  1. J. McCawley (U. Chicago, USA), Truth functionality and natural deduction
  2. J. Mizioł (U. Manitoba, CAN), Ternary-place functions that are complete with constants
  3. H. Leblanc (Temple U, USA), A completeness theorem for 3-valued logic with quantifiers
  4. H. Ellzey (IBM T. J. Watson Res. Center, USA) and Y. Patt (ICSCU, USA), The linearity property and functional completeness in M-valued logic
  5. C. Morgan (U. Alberta, CAN), Similarity as a theory of graded equality for a class of many-valued predicate calculi
  6. H. Przyluski (U. Toronto, CAN), Supervarieties in two dimensions

Friday, May 16, evening
- The annual meeting of the Society for Exact Philosophy continues into the weekend
The 1975 INTERNATIONAL SYMPOSIUM ON MULTIPLE-VALUED LOGIC continues to bring together those having interests related to the theory and applications of multiple-valued logic. This ADVANCE PROGRAM provides an early schedule indicating the variety of interest areas for papers and the distinguished participants from different countries. This FIFTH ANNUAL SYMPOSIUM is supported by the following organizations: ACM, IEEE Computer Society, and Society for Exact Philosophy.

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- Invited Address: R. Bellman (USC, USA), Local Logics

CHAIRMAN: E. Santor (Youngstown St, USA)
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2. D. Rine (Wvu, USA), Associative and multiple-valued logic techniques to improve some X-ray image processing
3. H. Wachter (UCI, USA), Applications of fuzzy logic to medical diagnosis.
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3. J. Lodder (Brighton Polytechnic, ENG), Second order and higher order universal decision elements in m-valued logic
4. G. Malinowski (Lodz, U, POL), Matrix representation for the dual counterparts of Lukasiewicz m-valued sentential calculi and the problem of their degrees of maximality
5. S. Hu (Cleveland SU, USA), A ternary algebra for probability computation of digital circuits

Thursday, May 15, morning
- Additional Papers and Informal Presentations

Thursday, May 15, morning
CHAIRMAN: A. Sloboda (UCLA, USA)
- Invited Address: M. Yoei (Technion, ISRAEL), Binary and multiple-valued models of binary gate networks

CHAIRMAN: D. Givone (SUNY Buffalo, USA)
1. H. Moufarr & I. Jordan (U Law, CAN), A design technique for an integrable ternary arithmetic unit
2. Z. Vranescu & V. Hamacher (U Toronto, CAN), Threshold logic in fast ternary multipliers
3. K. Hickin & V. Plotkin (MSM, USA), Compactly and p-valued logics
4. E. Dientjes (Paris VI U, FRANCE) & M. Israel (CNAM, FRANCE), Implementation of a complete ternary algebra with elementary operators—application to ternary flip-flop
5. K. Kitahashi (Osaka U, JAPAN), A survey of studies on multiple-valued logic in Japan
6. S. Lee & Y. Keren-Zvi (U Houston, USA), A generalized Boolean algebra and its application to logical design

Thursday, May 15, afternoon
CHAIRMAN: G. Abraham (Naval Res. Lab., USA)
- Invited address: G. Mezei (U III. Urbana, USA), Some multi-valued approaches to two-valued switching problems

CHAIRMAN: S. Su (CUNY, USA)
1. C. Moraga (U Dortmund, W. GERMANY & U Santa Maria, CHILE), Hybrid logic—a fast ternary adder
2. J. Deschars & A. Thayse (MBLE Res. Lab., BELGIUM), Representations of discrete functions
3. R. Cheung & G. Purvis (Packard Inc., USA), A computer oriented, heuristic minimization algorithm for multiple-output, multiple-valued switching functions
4. T. Higuchi & M. Kameyama (Tohoku U., JAPAN), Ternary logic system based on T-gate
5. V. Pinkava (Severalls Hospital, ENG), Some further properties of the Pi-logics
6. T. Weesekamp (Virginia Polytech. & SU, USA), The logical foundations of microlanguages

1975 International Symposium on Multiple-Valued Logic
May 13-16, 1975, at Pople's Center, Indiana University, Bloomington, Indiana 47401 USA
Advance Registration Closes May 1, 1975

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1975 Symposium Committee:
Dr. G. Epstein
Symposium Chairman
Indiana University
Dr. N. Cocchiarella
Program Vice-Chairman
Indiana University
April 7, 1975

Dear Colleague:

This is to bring to your attention the existence of a Wednesday evening session, May 14, at the 1975 International Symposium on Multiple-Valued Logic, for informal presentations and additional papers which were received too late for refereeing or inclusion in the Proceedings.

We would be pleased for you to discuss or present your lately received work at this session. It is planned for Professor Sobocinski to begin the session with a one-hour talk, with subsequent presentations each of 15 minutes in length, as in the daytime sessions.

Since these 15 minute time slots may fill up rapidly once the Symposium begins, it would be best for me to hear from you about this as soon before May 13 as possible.

Sincerely,

George Epstein
Symposium Chairman

GE/bh
Information Copy to Professor Boleslaw Sobocinski
PARTICIPANTS

1975 International Symposium on Multiple-Valued Logic

Allen, Michael C.
Altman, Jeffrey
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Anderson, Susan
Aron, Ellen
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Cignoli, Roberto L.
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Eberhart
Ellozy, Hamed A.
Etymemble, Daniel
Gale, Stephen
Giles, Robin
Hamacher, V.C.
Hansen, John C.
Hardegree
Herzberger, Hans G.
Higuchi, Tatsuo
Hu, Sung
Huang, H.K.
Hunter, David
Israel, Michael
Jaworowski, Jan
Kameyama, Michitaka
Kittel, Phyllis M.
Larson, James
Levy, Gerard
Liddell, Gerrad
Loader, John
McCawley, James D.
Macvicar-Whelen, P.J.
Maraga
Mettez, Gernot
Michalski, R.S.
Micheel, L.
Miller, David Michael
Moore, John
Morgan, Charles G.
Mouftah, Hussein T.
Muzio, Jon
Pao, Yoh-Han
Pinkava, Vaclav
Rapaport, William J.
Rasiowa, Helena
Rine, David
Rosenberg, Ivo G.
Santos, Eugene
Schotch, Peter
Smith, K.C.
Sobocinski
Su, Stephen Y.H.
Surma, S.
Swartwout, Robert E.
Tadahiro, Kitahashi
Thulin, Fred
Tront, Joseph G.
Ulrich, Dolph
Vranesic, Z.G.
Wasserman, Howard C.
Weschler, Harry M.
Wesselkamper, T.
Wherritt, Robert
Wolf, Robert
Yoeli, Michael
Zadeh, Lotfi

Pre-registered, did not attend as of Wed. 5 pm

Kirin, Vladamir
LaGrand, Paul
Leblanc, Hugues
Ledley, Robert S.
Plotkin, Jacob
Purvis, David M.
Stewart, William J.
Thomas, Robert J.
Wojcik, Anthony
Wolf, Robert G.
Buchstaben und Zahlen
II. Juni 1964/65
Spezial
Podewitz
Mein Chef
Hier ein Texte...