ON THE GEOMETRICAL INTERPRETATIONS OF THE INTUITIONISTIC FUZZY LOGICAL OBJECTS. Part 3.

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Continuing the ideas from [1-3], we shall describe a fourth geometrical interpretation of the Intuitionistic Fuzzy Logical (IFL-) objects (see e.g. [4,5]).

Let a set S of propositions be fixed. Let the truth-valued function V is defined as follows. For $p \in S$:

$$V(p) = <\mu(p), \gamma(p)>,$$

where the functions $\mu: S \to [0, 1]$ and $\gamma: S \to [0, 1]$ define the degrees of validity and of non-validity.

A difference with the first three interpretations is here that we shall not attach a condition for a relation between $\mu(p)$ and $\gamma(p)$. In the end we shall discuss this relation.

For the newly generated function V, all of the defined in [4, 5] operations and operators will be valid.

Contrary to the geometrical interpretation of the three previous types of IFL-objects, the geometrical interpretation of the new ones has the form shown in Fig. 1.

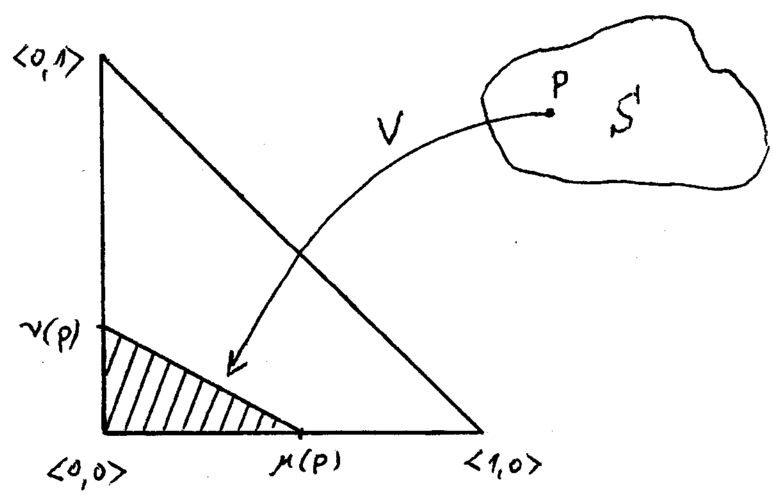

Fig. 1.

Here the legs of the rectangular triangle have lenghts $\mu(p)$ and $\gamma(p)$ respectively.

We must note that these geometrical interpretations can be drawn by a ruler and compass alone.

Let the propositions p and q have the geometrical interpretations in Fig. 2. Then the propositions ┐p (a negation of p), p & q (a conjunction of p and q), p ⊻ q (a disjunction of p and q), p ⊃ q (a sg-implication and a (max-min)-implication of p and q) have the froms from Fig. 3-7, respectively. The geometrical interpretations of operators D_a, $F_{a,b}$, $G_{a,b}$, $H_{a,b}$, $H^*_{a,b}$, $J_{a,b}$ and $J^*_{a,b}$ (see [4]) are given in Fig. 8-14, respectively and

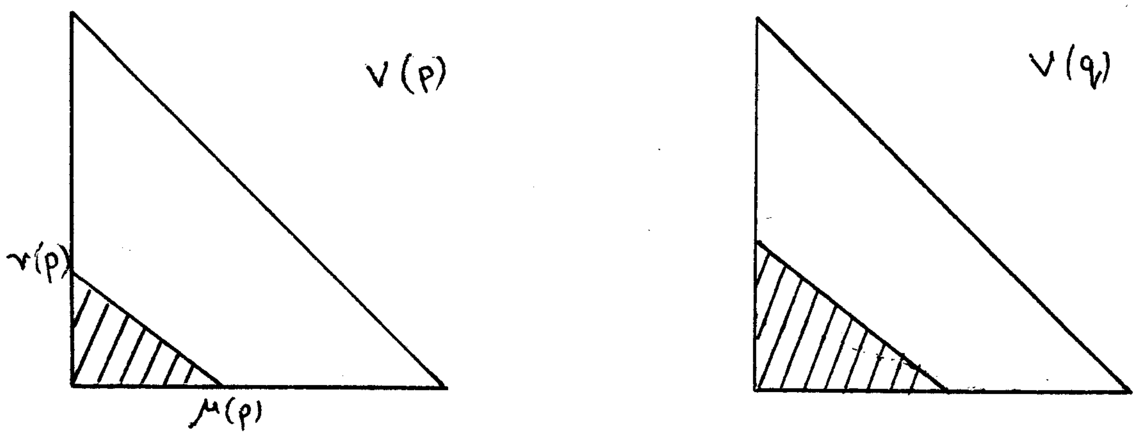

Fig. 2

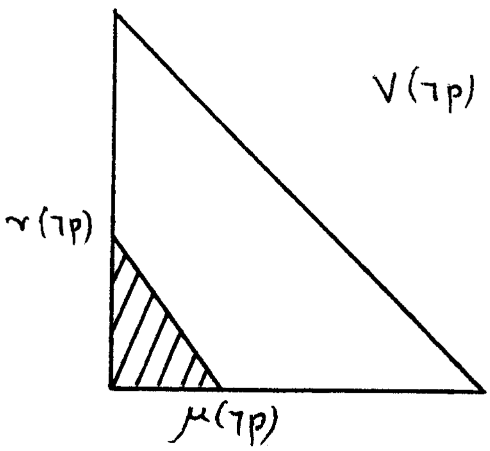

Fig. 3

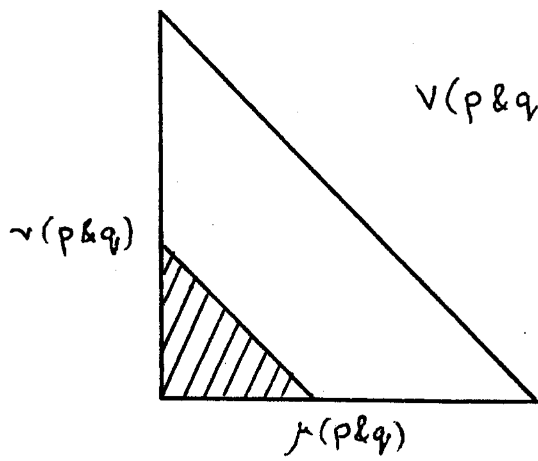

Fig. 4

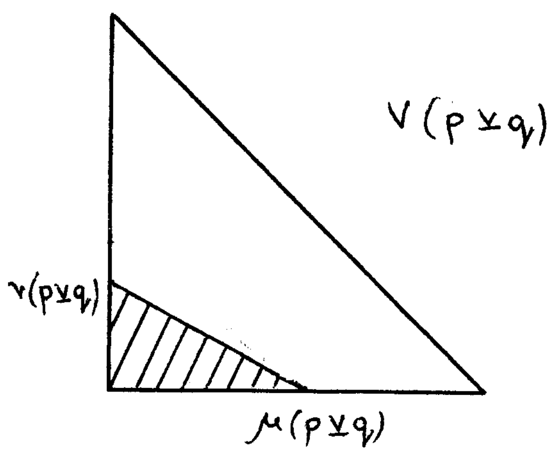

Fig. 5

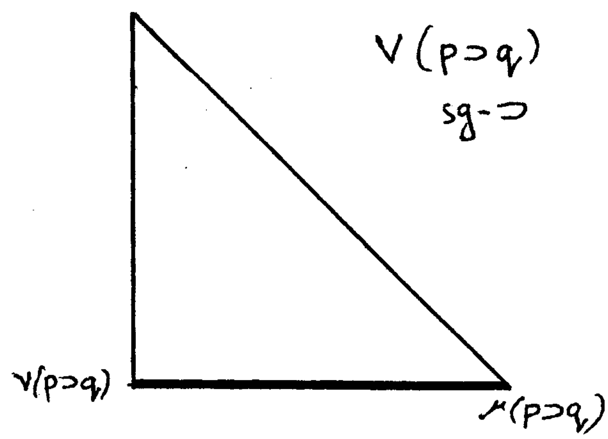

Fig. 6

in Fig. 15 and 16 the geometrical interpretations of $P_{a,b}$ and $Q_{a,b}$ (see [5]) are given.

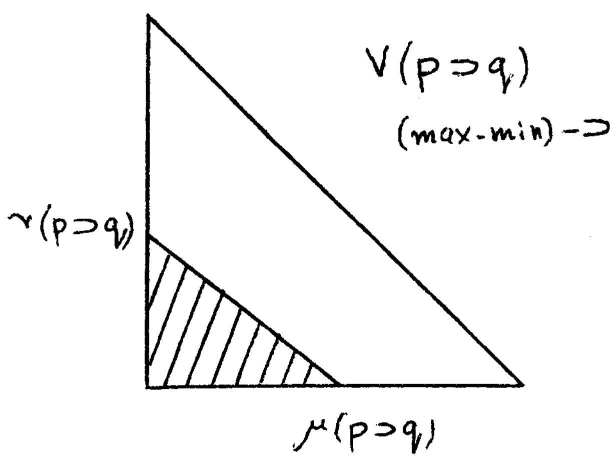

Fig. 7

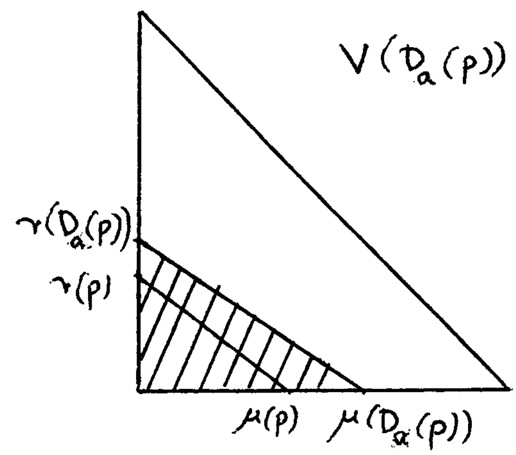

Fig. 8

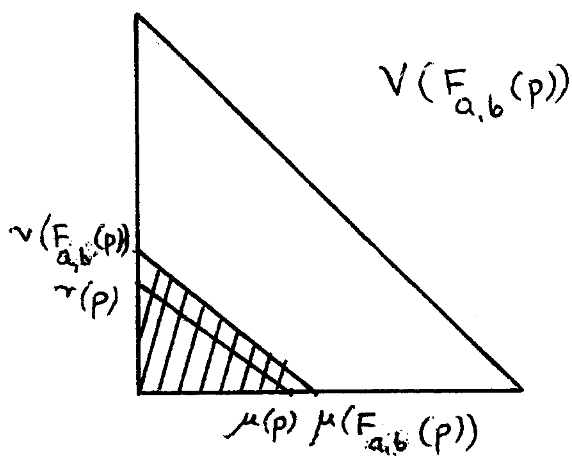

Fig. 9

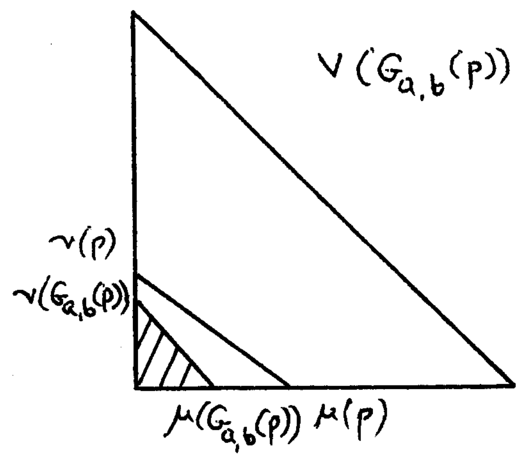

Fig. 10

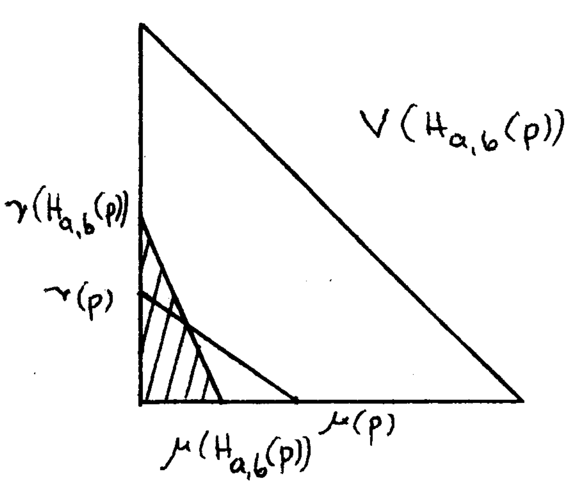

Fig. 11

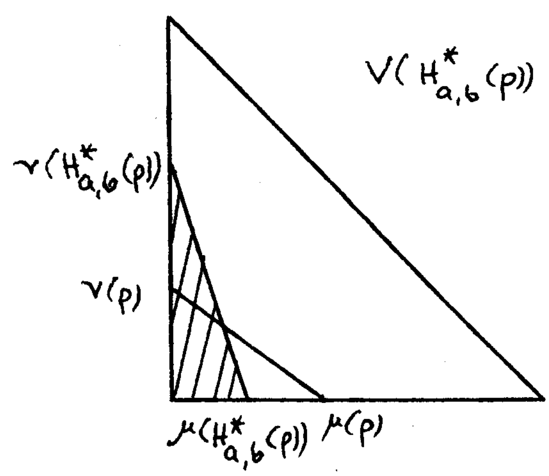

Fig. 12

Finally, we note that here the condition $\mu(p) + \gamma(p) \leq 1$ is omitted. When it is not valid (in all above examples it is valid), the values can be changed by the means described in [6].

The area of the triangle can be used as a measure for determinacy of the evaluated proposition p (see [7]).

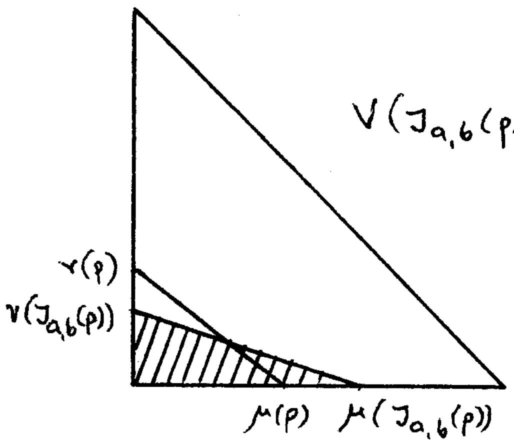

Fig. 13

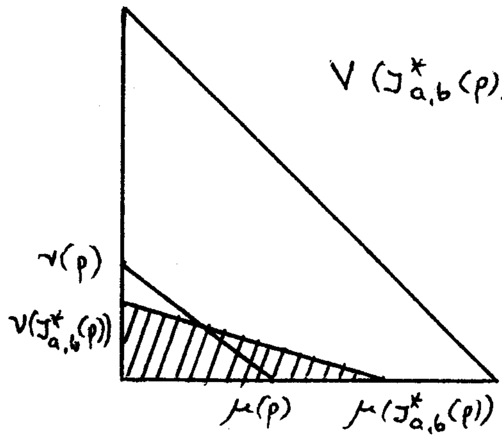

Fig. 14

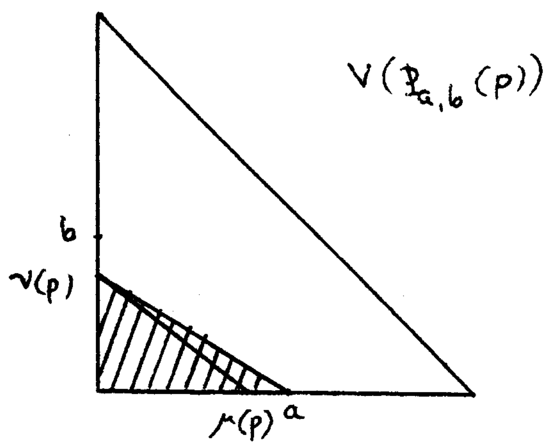

Fig. 15

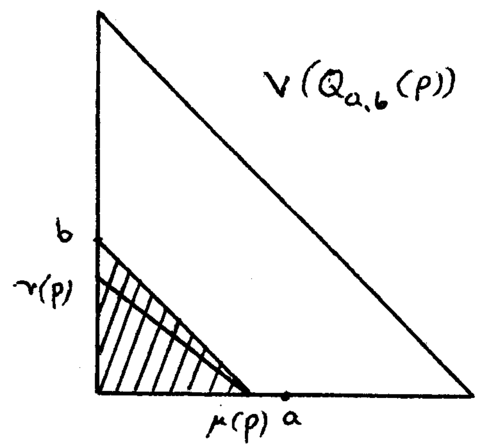

Fig. 16

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