CONSTRUCTIVE CLASSIFICATIONS OF LOGICS

LARISA MAKSIMOVA

1. Perceptibility and recognition

Classifications of logics are considered over the Johansson minimal logic J and modal logics.

Let L_0 be a J-logic, L be a finitely axiomatizable logic containing L_0. Say that L is perceptible over L_0 if there is an algorithm verifying for any formula A, if the inclusion $L_0 + A \geq L$ holds; L is strongly perceptible over L_0 if there is an algorithm verifying for any finite set Rul of axioms and rules of inference, if the inclusion $L_0 + Rul \geq L$ holds; L is recognizable over L_0 if there is an algorithm verifying for any formula A the equality $L_0 + A = L$; L is strongly recognizable over L_0 if there is an algorithm verifying for any finite set Rul of axioms and rules of inference the equality $L_0 + Rul = L$.

Proposition. (1) The logic Int is recognizable over J.

(2) The logic Neg $=$ J $+ \perp$ is strongly recognizable over J.

It is unknown if Int is strongly recognizable over J.

2. Tabularity and pretabularity

Theorem. Tabularity and pretabularity are decidable over J and S4. All these pretabular logics are recognizable.

3. Slices and levels

There are two extensions over J of T. Hosos's slices over Int. Denote

$\pi_0 = p_0$, $\pi_{n+1} = p_{n+1} \vee (p_{n+1} \to \pi_n)$, $\lambda_0 = \perp$, $\pi_{n+1} = p_{n+1} \vee (p_{n+1} \to \lambda_n)$

A J-logic L is a logic of the n-th slice, if it contains π_n and does not contain π_{n-1}; it is the logic of the n-th level, if contains λ_n and does not contain λ_{n-1}.

1. The set of J-logics of the infinite level is strongly decidable.
2. The number of any level over J is strongly calculable.
3. The number of any slice over J is calculable.
4. The number of any finite slice over J is strongly calculable.

Problem. Is the set of finite-slice logics over J strongly decidable?

5. The number of any slice over Gl$=$ J$+$ $p \vee \neg p$ is strongly calculable.

So the classification by slices is strongly calculable over Gl.

4. Interpolation properties

All variants of interpolation properties are decidable over Int and S4.

1. L.L.Maksimova, V.F.Yun. Extensions of the minimal logic and interpolation problem. Siberian Math. J., 59, 4, (2018), 681–693.

2. L.L.Maksimova. Classification of extensions of the modal S4 logic. Siberian Math. J., 54, 6 (2013), 1337–1352.

Sobolev Institute of Mathematics, Novosibirsk
E-mail address: lmaksi@math.nsc.ru