Chagrov, A. V.

Decidable modal logic with undecidable admissibility problem. (English. Russian original) Zbl 0782.03005

Algebra Logic 31, No. 1, 53-61 (1992); translation from Algebra Logika 31, No. 1, 83-93 (1992).

The admissibility problem for a given logic L is to determine whether an arbitrary given inference rule $A_1(p_1,\dots,p_n),\dots,A_m(p_1,\dots,p_n)/B(p_1,\dots,p_n)$ is admissible in L, i.e., for all formulas $C_1,\dots,C_n$, $B(C_1,\dots,C_n)\in L$ whenever $A_1(C_1,\dots,C_n)\in L,\dots,A_m(C_1,\dots,C_n)\in L$.

As is known, V. Rybakov proved the decidability of the admissibility problem for a number of intermediate and modal logics.

In this paper, the author constructs a decidable normal modal logic for which the admissibility problem is undecidable. The logic is an extension of K4 of width 3 and has infinitely many axioms.

Reviewer: M.Zakharyashev (Moskva)

MSC:

03B45 Modal logic (including the logic of norms)
03B25 Decidability of theories and sets of sentences

Keywords:

inference rule; admissible rule; decidability; normal modal logic

Full Text: DOI

References:

[1] V. V. Rybakov, "Problems of admissibility and substitution, logical equations and restricted theories of free algebras," in: Logic, Methodology and Philosophy of Science VIII, Elsevier (1989), pp. 121–139. · Zbl 0691.03012

[2] V. V. Rybakov, "On admissibility of inference rules in modal logicG," Tr. Inst. Mat. Sib. Otd. Akad. Nauk SSSR,12, 120–138, (1989).

[3] V. V. Rybakov, "Equations in free closure algebras and the substitution problem," Dokl. Akad. Nauk SSSR,287, No. 3, 554–557 (1986).

[4] G. D. Birkhoff, Lattice Theory, Amer. Math. Soc. (1979).

[5] K. Fine, "Logics containing K4, Part I," J. Symb. Logic,39, No. 1, 31–42 (1974). · Zbl 0287.02010 · doi:10.2307/2272340

[6] A. I. Mal'tsev, "Identical relations on quasigroup varieties," Mat. Sb.,69, No. 1, 3–12 (1966).

