▶ ILYA SHAPIROVSKY, *Satisfiability problems on sums of Kripke frames.*

Steklov Mathematical Institute of Russian Academy of Sciences,
Institute for Information Transmission Problems of Russian Academy of Sciences.
E-mail: `ilya.shapirovsky@gmail.com`.

The complexity of satisfiability problems in modal logic has been systematically investigated since the 1970s; for many logics (e.g, for the standard systems K, T, K4, S4) this problem is known to be PSPACE-complete [1], [3].

In many cases, PSPACE upper bound can be established using the operation of sum of relational structures (Kripke frames) [2]. Given a family $(\mathsf{F}_i \mid i$ in $\mathsf{I})$ of frames indexed by elements of another frame I (of the same signature), the *sum of the frames F_i's over* I is obtained from their disjoint union by connecting elements of i-th and j-th distinct components according to the relations in I. Given a class $\mathcal{F}$ of frames-summands and a class $\mathcal{I}$ of frames-indices, $\sum_{\mathcal{I}} \mathcal{F}$ denotes the class of all sums of F_i's in $\mathcal{F}$ over I in $\mathcal{I}$. In this talk we discuss conditions under which the modal satisfiability problem on $\sum_{\mathcal{I}} \mathcal{F}$ is polynomial space Turing reducible to the modal satisfiability problem on $\mathcal{F}$.

[1] R. LADNER, *The computational complexity of provability in systems of modal propositional logic*, **SIAM Journal on Computing**, vol. 6 (1977), no. 3, pp. 467–480.

[2] I. SHAPIROVSKY, *PSPACE-decidability of Japaridze's polymodal logic*, **Advances in modal logic** (London), AiML, vol. 7, College Publications, 2008, pp. 289–304.

[3] E. SPAAN, **Complexity of modal logics**, PhD thesis, University of Amsterdam, Institute for Logic, Language and Computation, 1993.