COMPUTABLE LINEAR ORDERS AND THEIR ISOMORPHISMS

M. ZUBKOV

The main goal of the first part of the talk is the description of the technique of limitwise monotonic functions in the theory of computable linear orders. We give the main definition of limitwise monotonic functions and their generalizations [1], and their main properties and show the connection of $\mathbf{0}'$-limitwise monotonic functions and computable presentations of linear orders with condensation η. Also, we give some applications of this technique in complete or partial solutions of problems of the theory of computable linear orders. One of such problem is the Kierstead's conjecture. In 1987, H. Kierstead stated the hypothesis that any computable presentation of a computable linear order has a strongly nontrivial Π^0_1-automorphism if and only if the order does not contain intervals of the type η. The technique of limitwise monotonic functions allows to obtain some partial positive answers of this hypothesis. The first positive partial answer was obtained by C. Harris, K. Lee and B. Cooper [2]. Later [3], their result was generalized by G. Wu and M. V. Zubkov. But in the main hypothesis of H. Kierstead is not true. It is proved by M.V. Zubkov and K.M. Ng [4]. In the last part of the talk we will consider question about categoricity and bi-embeddable categoricity of linear orders.

References

[1] M. V. Zubkov, A. N. Frolov *Computable linear orders and limitwise monotonic functions* // Proceedings of the Seminar on Algebra and Mathematical Logic of the Kazan (Volga Region) Federal University, Itogi Nauki i Tekhniki. Ser. Sovrem. Mat. Pril. Temat. Obz., VINITI, Moscow. – 2018. – V. 157. – P. 70–105.

[2] Harris C. M., Lee K. I., Cooper S. B. *Automorphisms of η-like computable linear orderings and Kierstead's conjecture* // Mathematical Logic Quarterly. – 2016. – V. 62., Is. 6. – P. 481–506.

[3] Wu G., Zubkov M. *The Kierstead's Conjecture and limitwise monotonic functions* // Annal of Pure and Applied Logic. – 2018. – V. 169., Is. 6. – P. 467–486.

[4] Ng K. M., Zubkov M. *On Kierstead's conjecture* // Transactions of the American Mathematical Society. – 2019. – V. 372., Is. 5 – P. 3713–3753.

KFU, Kazan
E-mail address: maxim.zubkov@kpfu.ru