Theorem 1. Let $[\Delta]$ be complete for existential sentences (consists of $\exists$-complete theories), X be a countable cl-atomic Jonsson set. Then $(1) \Rightarrow (2)$ and $(2) \Leftrightarrow (3)$:

(1) X is (Σ, Σ)-atomic set;

(2) X is Σ^*-nice-algebraically prime set;

(3) X is Σ-nice-algebraically prime set.

Theorem 2. Let $[\Delta] \in JSp(K)$, a class $[\Delta]$ be universal and $\exists$-complete, $X \subseteq C_{[\Delta]}$ be a countable algebraically prime cl-atomic Jonsson set. Then there exists a Jonsson set $Y \subseteq C_{Fr(X)}$ such that $cl(Y) = M$, $M \in K$ and M is (Σ, ∇)-atomic model for $Fr(X)$.

All necessary definitions can be found from (1; 3; 5)

Acknowledgment: This research has is funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant No. AP23489523).

References

[1] Yeshkeyev A.R., Theories and their classes, in two volumes, Volume 1, KarU, 2024, 282.

[2] Yeshkeyev A.R., Ulbrikht O.I., "JSp-cosemanticness and JSB-property of abelian groups", Siberian Electronic Mathematical Reports, 13 (2016), 861–874.

[3] Yeshkeyev A.R., Theories and their classes, in two volumes, Volume 2, KarU, 2024, 297.

[4] Baldwin J.T., Kueker D.W., "Algebraically Prime Models," *Annals of Mathematical Logic*, 20 (1981), 289–330.

[5] Yeshkeyev A.R., Ulbrikht O.I., Issayeva A.K., "Algebraically prime and atomic sets", Turkic World Mathematical Society Journal of Pure and Applied of Mathematics, 14:2 (2023), 232–245.

ALGEBRAIC STRUCTURE OF THE JONSSON SPECTRUM

Yeshkeyev Aibat Rafhatovich[1], **Tungushbayeva Indira Orazbekovna**[2]

[1,2]Karaganda Buketov University, Karaganda, Kazakhstan

[1]E-mail: yeshkeyev_a@buketov.edu.kz

[2]E-mail: tungushbayeva_i_1@buketov.edu.kz

We consider Jonsson theories of a countable first-order language L of the signature σ. By theory, we mean a consistent set of L-sentences. We write E_σ for the class of L-structures that are existentially closed in the class of all L-structures.

Let T_1 and T_2 be Jonsson L-theories, and let $M \in E_\sigma$ be a model of $T_1 \cup T_2$. Then $T_1 \cup T_2$ is a Jonsson L-theory.

Let K be a class of L-structures. A Jonsson spectrum (1) of K is the following set of theories:

$$JSp(K) = \{T \mid T \text{ is a Jonsson theory and } K \subseteq Mod(T)\}.$$

Let K_σ be a class of L-structures containing a structure $M \in E_\sigma$. Then $(JSp(K_\sigma), \cup)$ is a commutative monoid.

Two Jonsson theories are called cosemantic if their semantic models (2) coincide. Cosemanticness is an equivalence relation. Let K be any class of L-structures, and let $JSp(K)_{/\bowtie}$ be a factor-set of

the Jonsson spectrum of K with respect to cosemanticness. Then $[T]$ denotes the cosemanticness class of a theory $T \in JSp(K)$.

Let us introduce the operations " $\wedge$ " and " $\vee$ " for arbitrary L-theories T and T' as follows (3). Let

$$T \wedge T' = \{\varphi \wedge \varphi' \mid \varphi \in T, \varphi' \in T'\},$$

if this theory is consistent. Similarly, let

$$T \vee T' = \{\varphi \vee \varphi' \mid \varphi \in T, \varphi' \in T'\}.$$

Each cosemanticness class $[T] \in JSp(K)_{/\bowtie}$ is a distributive lattice with respect to operations " $\vee$ " and " $\wedge$ ".

Acknowledgements: This research was funded by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant No. AP23489523)

References

[1] Yeshkeyev A.R., Ulbrikht O.I., "JSp-cosemanticness and JSB-property of abelian groups", Siberian Electronic Mathematical Reports, 13 (2016), 861-874.

[2] Ешкеев А.Р., Теории и их модели: монография в 2-х томах. Том 1, Издательство КарУ им. академика Е.А. Букетова, Караганда, 2024, 282 с.

[3] Mustafin Ye., "Some properties of Jonsson theories", Journal of Symbolic Logic, 67:2 (2002), 528–536.

WEIGHTED ESTIMATES FOR SOME CLASS OF QUASILINEAR OPERATORS

Zhangabergenova Nazerke Salmenkyzy[1], **Manarbek Makpal**[2]

[1]L.N. Gumilyov Eurasian National University, Institute of mathematics and mathematical modeling, Astana, Kazakhstan

[1]E-mail: zhanabergenova.ns@gmail.com

[2]Institute of mathematics and mathematical modeling, Almaty, Kazakhstan

[2]E-mail: makpal9136@mail.ru

Let $0 < q, p, r < \infty$ and $\frac{1}{p} + \frac{1}{p'} = 1$. Let $u = \{u_i\}_{i=1}^{\infty}$ and $v = \{v_i\}_{i=1}^{\infty}$ be weight sequences, i.e., positive sequences of real numbers. We denote by $l_{p,v}$ the space of sequences $f = \{f_i\}_{i=1}^{\infty}$ of non-negative real numbers such that

$$\|vf\|_p = \left(\sum_{i=1}^{\infty}(v_i f_i)^p\right)^{\frac{1}{p}} < \infty.$$

For any non-negative $f \in l_{p,v}$ we consider the following iterated discrete Hardy-type inequality with three weights

$$\left(\sum_{n=1}^{\infty} u_n^q (K^{\pm} f)_n^q\right)^{\frac{1}{q}} \leq C \left(\sum_{i=1}^{\infty}(v_i f_i)^p\right)^{\frac{1}{p}}, \tag{1}$$