On April 19, 2010 Galina Borisovna Belyavskaya turned 70. Presently she is a leading researcher in the Institute of Mathematics and Computer Science of the Academy of Sciences of the Republic of Moldova. She has made a significant contribution to the development of binary and \(n\)-ary quasigroup theory and published about 70 research works in mathematical journals.

For more than 20 years Galina was the Scientific secretary of the Specialized Council for conferring scientific degree at the Institute of Mathematics of the Academy of Sciences of Moldova.

G. Belyavskaya was born in Ust'-Kamenogorsk, the capital of the East-Kazakhstan Region of former USSR (now Oskemen in Kazakhstan). Her parents, born in Altai Region (Siberia) were engineers. Her father worked as a trees rafter on Siberian rivers. Both were Russian. The father’s mother
had re-married after her first husband died. G. Belyavskaya’s father took
polish sounding surname after her stepfather. Galina stayed with this sur-
name. In the middle fifties the family moved to Gomel (Belarus) and then
to Kishinev where her father became a teacher.

After her father she also inherited the love to play chess. In her youth
she played chess and became a junior chess champion of Moldova.

In 1957 she began study at the Faculty of Physics and Mathematics of
the Kishinev State University which she graduated with honors in 1962. In
the same year she joined the newly established Institute of Mathematics
of the Academy of Sciences of the Republic of Moldova, that was then a
branch of the Academy of Sciences of the USSR. She still works there today.

Initially she worked in the computer laboratory and develop new pro-
gramming languages, algorithms and software. Her paper [1] is from that
period. In this paper one simple criterium for classifications of partially
symmetric boolean functions is presented.

Since 1967, Belyavskaya begins cooperation with V. D. Belousov. Her
first papers devoted to quasigroups are connected with the problem of a
prolongation (extension) of quasigroups, i.e., a construction of a quasigroup
on \((n + 1)\)-th order from a quasigroup of \(n\)-th order, and with the problem
of a contraction (compression), i.e., a construction of a quasigroups of \(n\-
th order from quasigroups of \((n + 1)\)-th order. Necessary and sufficient
conditions under which two contraction of a given quasigroup are isotopic
are found in [2] and [3]. A new method of a prolongation is presented in
[5]. Necessary and sufficient condition of isotopy of such two prolongations
of a given quasigroup are found too. The problem of construction and
decomposition of quasigroups was investigated in many of her papers (cf.
[12], [27] and [33]).

Next she studied the systems of binary operations containing two pro-
jections, all quasigroup operations defined on a fixed set \(Q\) and satisfying
the generalized Stein’s identity ([7], [8] and [13]). Properties of such systems
are described by means of balanced incomplete block design. A method for
constructing such systems is presented in [7]. Later she generalized those
results to the systems of \(n\)-ary quasigroup operations (see [49] and [61]).

Many papers of G. B. Belyavskaya are connected with the problem of
ortogonality of binary and \(n\)-ary quasigroups. She start with a character-
ization of \(r\)-orthogonal quasigroups, i.e., quasigroups \(Q(\cdot), Q(\circ)\) for which
the set \(\{(x \cdot y, x \circ y) : x, y \in Q\}\) contains exactly \(r\) different ordered pairs. In
[16] it is proved that for any \(n \geq 4\) there exist \((n + k)\)-orthogonal quasigroups
for any $k$ with $2 \leq k \leq \lfloor n/2 \rfloor$. Necessary and sufficient conditions for a finite quasigroup to have an $r$-orthogonal quasigroup are found in [17]. Abelian groups of order $n > 2$, $n \neq 4$, have no $(n^2 - 2)$-, $(n^3 - 3)$- or $(n^2 - 5)$- orthogonal quasigroups. Groups of prime order $n$ have no $(n+2)$-, $(n+3)$-, $(n+4)$- or $(n+5)$-orthogonal quasigroups. A method of construction of $(n^2 - 2)$-orthogonal quasigroups of even order $n$, where $n \neq 1$(mod 3), by means of extensions of abelian groups is given in [21]. The set of possible values of $r$ for which there exist pairs of $r$-orthogonal quasigroups of order $n$ is described in [23], [25] and [37]. The class of self-orthogonal $n$-ary groupoids is characterized in [31]; pairwise orthogonality of $n$-ary operations in [53].

A new and more general version of orthogonality for $n$-ary operations is presented in [53] and [57]. It is connected with hypercubes which are a generalization of Latin squares to higher dimensions.

A series of her papers is devoted to admissible quasigroups $Q(\cdot)$, i.e., quasigroups with $m$ elements containing a sequence of $m$ elements from different rows and columns of the multiplication table of $Q(\cdot)$. If this sequence has exactly $t$ distinct elements, then we say that a quasigroup $Q(\cdot)$ is $t$-admissible. The main results of Belyavskaya on such quasigroups are contained in [15], [18] and [24]. For example, all numbers $t$ such that a cyclic group $G$ is $t$-admissible are determined in [15]. For an arbitrary finite group similar result is obtained in [24]. Admissible $n$-ary quasigroups are studied in [19], [20] and [22].

In the early seventies of last century Belyavskaya investigated semisymmetric Stein quasigroups, for which she proved that a semisymmetric Stein quasigroup is invariant under parastrophy [9]. In this paper she also shows that a semisymmetric Stein quasigroup is isotopic to a group if and only if it is distributive.

In the late eighties Belyavskaya’s scientific interest has been focused on the study of algebraic problems of quasigroups. In that time she introduced several new concepts and has received many important results. To the most important concepts should be included the concept of chain isotopic quasigroups [4], the concept of the centre and the new concept of nuclei that have led to many significant results (cf. [29], [30], [34], [36], [40], [41]). Commutators and associators of quasigroups introduced and described by her (cf. [44], [45], [46] and [47]) are useful during investigations of quasigroups.

A large cycle of her works is devoted to $T$-quasigroups and quasigroups which are linear or algebraic over groups (cf. [38], [39], [42] and [43]). The
characterization of $T$-quasigroups, linear and a linear quasigroups with the help of identities is one of the most important results in the theory of quasigroups which are linear over groups.

The last papers of G. Belyavskaya are connected with universal-algebraic problems of the theory of quasigroups and with application of binary and $n$-ary quasigroups in coding theory. In [65] she suggests a general method of the construction of secret-sharing schemes based on orthogonal systems of partial (in particular, everywhere determined) $k$-ary operations which generalizes some known methods of the construction of such schemes by finite fields and point out the orthogonal systems of $k$-ary operations respective of these known schemes.

Galina Belyavskaya was a supervisor of five PhD thesis (S. Murathudjaev, A. Lumpov, P. Syrbu, L. Ursu, A. Tabarov). Many scientists from Moldova and other countries were trained under her supervision. She was the scientific adviser of graduate students from the Kishinev State University.

Since 1971 G. B. Belyavskaya was the assistant of V. D. Belousov in the sector of the theory of quasigroups. After his death she has headed the research team of the theory of quasigroups at the Institute of Mathematics of the Academy of Sciences of Moldova.

She is an Advisory Editor of the international journal *Quasigroups and Related Systems*, and also a member of the Editorial Board of the *Bulletinul Academiei de Ştiinţe a Republicii Moldova, Matematica*.

G. B. Belyavskaya is kind, sympathetic, delicate, trustworthy, very disciplined, honest and modest woman. She is a good wife, mother, grandmother and great grandmother. Recently she has became interested in esoteric and she published two books on this topic.

Dear Galina Borisovna: The authors of this note heartily congratulate you on your 70th birthday and wish you continuing success in your scientific and pedagogical work, strong health, and many long years of life. Thank you for all that you have done for us.

Wieslaw A. Dudek
Victor Shcherbacov
Below we present the full list of publications of Galina B. Belyavskaya. English translations of Russian titles as given in Mathematical Reviews and Zentralblatt für Mathematik may be somewhat different from those used in this list.

List of publications of Galina B. Belyavskaya


7. *S-systems of an arbitrary index, I*, (with A. M. Cheban), (Russian), Mat. Issled. 7 (1972), 27–43.


21. *Construction of (n–2)-orthogonal quasigroups of even order n, where n–1 ≠ 0(mod 3)*, (Russian), Mat. Issled. 51 (1979), 23–26.


28. *Completion of a group and the construction of orthogonal quasigroups of order 3t + i, i = 0, 1, 2, t ≠ 2, 6, with orthogonal subquasigroups of order t*, (with A. V. Nazarok), (Russian), Mat. Issled. 95 (1987), 39–52


33. Complete direct decompositions of quasigroups with an idempotent, (Russian), Mat. Issled. 113 (1990), 21 – 36.
34. On the concept of a center in a quasigroup, (Russian), Mat. Issled. 120 (1991), 8 – 17.
35. On one equivalence in quasigroups, (with A. D. Lempov), (Russian), Mat. Issled. 120 (1991), 18 – 29.
42. Abelian quasigroups are $T$-quasigroups, Quasigroups and Related Systems 1 (1994), 1 – 7.


54. On some quasi-identities in finite quasigroups, (with A. Diordiev), Bul. Acad. Științe Repub. Mold., Mat. 3 (49) (2005), 19 – 32.


57. Orthogonal hypercubes and n-ary operations, Quasigroups and Related Systems 13 (2005), 73 – 86.


65. Secret-sharing schemes and orthogonal systems of k-ary operations, Quasigroups and Related Systems 17 (2009), 161 – 176.

66. Check character systems and totally conjugate orthogonal T-quasigroups, Quasigroups and Related Systems 18 (2010), 7 – 16.

67. Polynomial k-ary operations, matrices, and k-mappings, J. Gen. Lie Theory Appl. 4 Article ID 109001.