National University of Uzbekistan
Holon Institute of Technology

A B S T R A C T S

of the International Online Conference

FRONTIER IN MATHEMATICS AND COMPUTER SCIENCE

October 12–15, 2020

TASHKENT

where $N_1 \geq \max\{a_1, \max\limits_x \frac{\|u_0\|}{s_0 - x}\}$, $N_2 \geq \max\{a_2, \max\limits_x \frac{\|v_0\|}{h_0 - x}\}$.

We establish the existence and uniqueness of a global classical solution and then study the asymptotic behavior of the solution of (1).

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GERSHGORIN BOUNDS FOR SEMIBOUNDED $n \times n$ BLOCK OPERATOR MATRICES

Rasulov T.H.

Bukhara State University, rth@mail.ru

Block operator matrices are matrices the entries of which are linear operators between Banach or Hilbert spaces [1]. They arise in various areas of mathematics and its applications: in systems theory as Hamiltonians, in the discretization of partial differential equations as large partitioned matrices due to sparsity patterns, in saddle point problems in non-linear analysis, in evolution problems as linearizations of second order Cauchy problems. Such systems occur widely in mathematical physics, e.g. in fluid mechanics, magnetohydrodynamics, and quantum mechanics. In all these applications, the spectral properties of the corresponding block operator matrices are of vital importance as they govern for instance the time evolution and hence the stability of the underlying physical systems. In this work we consider the self-adjoint semi-bounded $n \times n$ block operator matrices and we will find their Gershgorin bounds.

Let $n \in \mathbb{N}$, $n \geq 3$, let $\big(\mathcal{H}_i, \| \cdot \|_i\big)$, $i = 1, \cdots, n$, be Hilbert spaces, and let $\big(\mathcal{H}, \| \cdot \|\big)$ be the Euclidean product of $\mathcal{H}_1, \dots, \mathcal{H}_n$, that is, $\mathcal{H} := \mathcal{H}_1 \oplus \cdots \oplus \mathcal{H}_n$.

In the Hilbert space $\mathcal{H}$ we consider linear operators $\mathcal{A}$ that admit an $n \times n$ block operator matrix representation,

$$\mathcal{A} = \begin{pmatrix} A_{11} & \cdots & A_{1n} \\ \vdots & \ddots & \vdots \\ A_{n1} & \cdots & A_{nn} \end{pmatrix},$$

where the diagonal entries $A_{ii} = A_{ii}^* : \mathcal{H}_i \to \mathcal{H}_i$, $i = 1, \dots, n$, are all bounded from below and the off-diagonal entries $A_{ij} : \mathcal{H}_j \to \mathcal{H}_i$, $i \neq j$, $i, j = 1, \dots, n$ are all bounded such that $A_{ji} = A_{ij}^*$. Then $\mathcal{A} = \mathcal{A}^*$ is bounded from below.

We recall that the spectrum $\sigma(\mathcal{A})$ of an operator $\mathcal{A}$ consists of those complex numbers λ such that $\mathcal{A} - \lambda$ is injective and is not boundedly invertible.

Main result of this work is the following theorem.

Theorem 1. *For the lower bound of $\mathcal{A}$ we have*

$$\min \sigma(\mathcal{A}) \geq g_{\min}(\mathcal{A}) := \min_{i=1}^{n}\Big(\min \sigma(A_{ii}) - \sum_{\substack{j=1\\ i\neq j}}^{n} \|A_{ij}\|\Big).$$

An analogous bound $g_{\max}(\mathcal{A})$ can be derived for $\max \sigma(\mathcal{A})$, if $A_{ii} = A_{ii}^* : \mathcal{H}_i \to \mathcal{H}_i$, $i = 1, \ldots, n$, are all bounded from above, see [2]. The quantities $g_{\min}(\mathcal{A})$ and $g_{\max}(\mathcal{A})$ are called Gershgorin bounds for $\mathcal{A}$.

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CENTRAL LIMIT THEOREMS FOR WEAKLY DEPENDENT RANDOM FIELDS WITH VALUES IN c_0 and $l_p(1 \leq p \leq 2)$ SPACES.

Ruzieva D.S.[1], Sharipov O.Sh.[2]

[1]*National University of Uzbekistan named after Mirzo Ulugbek, Tashkent, Uzbekistan,*
dilnura.saidovna@gmail.com

[2]*National University of Uzbekistan named after Mirzo Ulugbek, Tashkent, Uzbekistan,*
osharipov@yahoo.com

Central limit theorems for real-valued random fields were studied by many authors (see [1] -[5] and references therein). In [6]-[9] the authors considered CLT for the random fields with values in infinite dimensional spaces. Let $X(t), t \in Z^2$ be a random field with values in c_0 (a space of all sequences $x = (x^{(1)}, x^{(2)}, ...)$ such that $\lim\limits_{n\to\infty} x^{(n)} = 0$ with a norm $\|x\| = \sup\limits_i |x^{(i)}|$). We assume that $X(t), t \in Z^2$ can be represented as

$$X(t) = f\left(\varepsilon(t-s), \quad s \in Z^2\right), \quad t \in Z^2$$

where $\left\{\varepsilon(j), j \in Z^2\right\}$ is a random field of iid random variables and f is a measurable function.

Our main goal is to prove central limit theorems for weakly dependent random fields $X(t), t \in Z^2$ with values in c_0 and $l_p(1 \leq p \leq 2)$. In the talk we will formulate our main results.

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