MSC XXXXX Research Article

The title of the article

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An abstract is a summary of a scientific article, which reveals its essence, reflects the novelty and research methods, research results. The abstract is published independently of the main text of the article, so it should be clear to the reader. The abstract should correspond to the content of the scientific article and should not contain information that is not in the main text of the article, as well as exaggerate the materials in the article. An abstract is a reference material about the main text of a scientific article, which is published in various library systems as an abstract, which allows the reader to understand whether the article is interesting and whether it is worth reading it in full. Therefore, it is necessary to write the annotation concisely and clearly. The abstract should contain no more than 200 words. The abstract has the structure: the object of research, the purpose, the methods and approaches used, the main results. Describe the main goal of the research, the object of the research. Explain which research methods were used without methodological details. Summarize the most important findings and their implications. The abstract should not contain references to sources of literature, formulas and other objects in a scientific article, as well as various abbreviations and abbreviations. Formulas are allowed in the annotation, if they are not too cumbersome and do not make it difficult to understand.

Key words: article, phrase, word, phrase.

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Introduction

We present you a template in the Latex system for registration of scientific articles in the journal Vestnik KRAUNC. Fiziko-matematičeskie nauki (Bulletin KRASEC. Physical and Mathematical Sciences). Information about the journal, its editorial policy, rules for authors can be found on the website http://krasec.ru/. The article submitted to the editor must be complete and not previously published anywhere. An exception is posting an article as a preprint on various portals, for example, https://arxiv.org/. The manuscript of the article should contain new results in the priority areas of the journal Vestnik KRAUNC. Fiz.-Mat. Nauki such as "Mathematics" , "Physics" , "Mathematical Modeling" , "Information and Computing Technologies" , "Instruments and Methods of Measurements". The journal can publish thematic articles, which are formed in special issues of the journal. Review articles, dissertation abstracts and other scientific reports can also be published in the journal in agreement with the editor-in-chief of the journal.

Please note that at the beginning of the article it is necessary to register the indexes MSC - Mathematics Subject Classification indexes, which can be found on the site http://www.ams.org/msc/. It is important to write down real-life indexes by research topic in the article. This is due to the fact that international scientific citation databases use these indices to find the necessary information according to the requests of readers.

It must be remembered that the article must have the desired structure, consist of sections and subsections. The main sections from which the article can be structured: title, abstract, keywords, main text, conclusion and bibliography. The authors of the article themselves choose the structure of their article. However, we recommend choosing the IMRAD structure – (Introduction, Methods, Results and Discussion).

Formatting formulas and links

In this section, we will provide some examples of a set of formulas that were used earlier in our magazine earlier. We recommend using the `equation` environment to format formulas. If you do not need to number the formula, you can use the `$ $` or `\[\]` environments.

Consider the following example taken from work[1].

Let Z_n $(n = 0, 1, 2, \ldots)$, a branching random process with discrete time and one type of particles. We introduce the generating functions

$$F(x) = \sum_{i=0}^{\infty} P_i(1)x^i, \quad F_n(x) = \sum_{i=0}^{\infty} P_i(n)x^i,$$

where

$$P_i(n) = P\{Z_i = n/Z_0 = 1\}, \ |x| \leq 1.$$

As is known, for generating functions the following relation holds:

$$F_i(t) = F(F_{i-1}(t)) \tag{1}$$

To split the formula into several lines, you can use the `multline` command, as in the article [2].

$$\varepsilon(t) = \frac{\sigma_0}{\eta} I_{0t}^{\alpha}\big(H(t) - H(t-t_1)\big) = \\ = \frac{\sigma_0}{\eta\Gamma(\alpha)}\left(H(t)\int_0^t (t-\tau)^{\alpha-1}d\tau - H(t-t_1)\left(\int_0^{t_1} + \int_{t_1}^t\right)(t-\tau)^{\alpha-1}d\tau\right) = \\ = \frac{\sigma_0}{\eta\Gamma(\alpha+1)}\big(t^{\alpha}H(t) - (t-t_1)^{\alpha}H(t-t_1)\big). \quad (2)$$

For a set of formulas, you can use any guide on LaTeX 2_{ε}, for example, you can use the help information from the Overleaf portal https://ru.overleaf.com/learn.

Formulas are referenced only with the `\eqref` command. References to tables and figures are given using the `\ref` command. For references to literature sources, use the `\cite` command. In the journal, it is necessary to give numbering only to those objects (formulas, figures, tables, elements of the bibliography) to which there are references in the content of the article.

References to formulas or other objects that are not "marked" will be denoted like this (??) or so [?].

Here we give some examples of references to sources of literature in the content of the article, taken from the work [1].

The asymptotic behavior of the probability Q_n for discrete time was studied by A. N. Kolmogorov [3]. The results of A. N. Kolmogorov for processes with continuous time, B. A. Sevastyanov [6].

A literary survey on limit and locally limit theorems, and in particular, a refinement of the asymptotic expansion for the probability Q_n, are briefly presented in C. B. Nagayev and R. Mukhamedkhanova [5]. Therefore, we do not dwell on the literary review. For critical branching processes $(A = 1)$ in the work [5, pp. 96-97] the following theorems are proved.

It is necessary to use environments for theorems, lemmas, remarks, corollaries, etc.

Environment enumeration `\engtheorem`, `\engdefinition`, `\englemma`, `\engforexample`, `\engremark`, `\task`, `\engconsequence`, `\engcorollary`, `\engproposition`, given manually in square brackets. Let's look at some examples.

The `engtheorem` environment is used to form theorems. For example, in the paper [1], the following theorems and lemmas were formulated.

Theorem 1. *If* $A = 1, B > 0, C < \infty$, *then for* $n \to \infty$

$$Q_n = \frac{2}{Bn} + \left(\frac{4C}{3B^3} - \frac{2}{B}\right)\frac{\ln n}{n^2} + o\left(\frac{\ln n}{n^2}\right).$$

Theorem 2. *If* $A = 1, B > 0, D < \infty$, *then for* $n \to \infty$

$$Q_n = \frac{2}{Bn} + \left(\frac{4C}{3B^3} - \frac{2}{B}\right)\frac{\ln n}{n^2} + \frac{4K}{B^2n^2} + O\left(\frac{\ln n}{n^3}\right),$$

where K *is some constant depending on the form* $F(x)$.

Lemma 1. *If* $a=0$, *factorial moments* $b>0, c, d$ *exist and* $x\in\{x:|x|\le 1, |x-1|\ge r>0\}$, *then for* $t\to\infty$

$$R(t,x)=\frac{2}{bt}+\frac{4c\ln t}{3b^2t^2}+\frac{4K(x)}{b^2t^2}+O\left(\frac{\ln^2 t}{t^3}\right), \tag{3}$$

where $K(x)$ *is some function of* x *depending on the form* $f(x)$.

Consequence 1. Under the assumptions of Lemma 1 for $t\to\infty$

$$Q(t)=\frac{2}{bt}+\frac{4c\ln t}{3b^2t^2}+\frac{4K(0)}{b^2t^2}+O\left(\frac{\ln^2 t}{t^3}\right). \tag{4}$$

Theorem 2. *If* $A=1,\ B,C,D>0,\ E<\infty$, *the for* $n\to\infty$

$$Q_n=\frac{2}{Bn}+\left(\frac{4C}{3B^3}-\frac{2}{B}\right)\frac{\ln n}{n^2}+\frac{4K_5}{B^2n^2}+\frac{8}{B^3}\left(\frac{C}{3B}-\frac{B}{2}\right)^2\frac{\ln^2 n}{n^3}+O\left(\frac{\ln n}{n^3}\right) \tag{5}$$

где

$$K_5=1+T\left[1+\frac{2}{B}c_1-\frac{8}{B^3}T\sum_{k=1}^{\infty}\frac{\ln k}{k^2}-\frac{4K_4}{B^2}\sum_{k=1}^{\infty}\frac{1}{k^2}+\frac{32}{B^5}T^2\sum_{k=1}^{\infty}\frac{\ln^2 k}{k^3}\right]+$$

$$+\left(\frac{B}{2}T+T_1\right)\left[1+\frac{4}{B^2}\sum_{k=1}^{\infty}\frac{1}{k^2}-\frac{32}{B^4}T\sum_{k=1}^{\infty}\frac{\ln k}{k^3}-\frac{16K_4}{B^3}\sum_{k=1}^{\infty}\frac{1}{k^3}+\frac{192}{B^6}T^2\sum_{k=1}^{\infty}\frac{\ln^2 k}{k^4}\right]+$$

$$+\left[\frac{B}{2}T_1+T^2+\frac{BD}{48}-\frac{E}{120}\right]\left[1+\frac{8}{B^3}\sum_{k=1}^{\infty}\frac{1}{k^3}-\frac{96}{B^5}T\sum_{k=1}^{\infty}\frac{\ln k}{k^4}-\frac{48K_4}{B^4}\sum_{k=1}^{\infty}\frac{1}{k^4}+\frac{758}{B^7}T^2\sum_{k=1}^{\infty}\frac{\ln^2 k}{k^5}\right]$$

$$T=\frac{B^2}{4}-\frac{C}{6},\ T_1=\frac{D}{24}-\frac{BC}{12}$$

$$K_4=1+\sum_{k=0}^{\infty}\rho_k+\left(\frac{B^2}{4}-\frac{C}{6}\right)\left[\frac{2c_1}{B}+\sum_{k=1}^{n-1}q_k+\left(\frac{4C}{3B^3}-\frac{2}{B}\right)\sum_{k=1}^{n-1}\frac{\ln k}{k^2}\right]$$

$$\rho_k=O\left(\frac{1}{k^2}\right),\ q_k=o\left(\frac{\ln k}{k^2}\right).$$

Remark 1. In the case of the existence of factorial moments $\alpha_6, \alpha_7,$, etc. it is easy to obtain an asymptotic expansion like (5). In this case, in different cases, different constants $K_6, K_7,$, etc. are obtained, which differ little from each other.

An example from the article [7].

In the area

$$Q=(-1,1)\times(0,T)\times\mathbb{R}=$$

$$=Q_1\times\mathbb{R}=\{(x,t,z);x\in(-1,1),0<t<T<+\infty,z\in\mathbb{R}\},$$

consider the Tricomi equation:

$$Lu=xu_{tt}-\Delta u+a(x,t)u_t+c(x,t)u=f(x,t,z), \tag{6}$$

Problem 1. *Find a generalized solution* $u(x,t,z)$ *of the equation* (6) *from the space* $W_2^{2,3}(Q)$ *satisfying the following boundary conditions*

$$\gamma D_t^p u|_{t=0} = D_t^p u|_{t=T}, \tag{7}$$

$$u|_{x=-1} = u|_{x=1} = 0 \tag{8}$$

for $p = 0,1$, *where* $D_t^p u = \frac{\partial^p u}{\partial t^p}$, $D_t^0 u = u$, γ — *some constant nonzero number, the value of which will be specified below.*

Definition 1. By a generalized solution of the problem (6)-(8) we mean the function $u(x,t,z) \in W_2^{2,3}(Q)$ satisfying the equation (6) with the conditions (7), (8) almost everywhere.

Proof. Justification of theorems, lemmas is carried out in the environment `engproof`. □

Remark 2. It should be noted that for an English-language article, the decimal separator is the point.

Design of figures and tables

Please note that the data in the figures and tables must be translated into English. Figures and tables are inserted using the `figure` and `table` environments. Please note that the figures are located in the `./fig/` directory. The name of the picture file is given by the first surname of the author, after which the number is placed. For example, `Ivanov1.eps, Ivanov1.png, Ivanov1.jpeg`. Figures must be necessarily vector (format `eps`). Only such pictures can be corrected and the necessary fonts introduced into them. It is possible to use bitmap drawings for photographs, screenshots `png, jpeg`, but such drawings must be original, they must not be compressed.

The table layout, taken from the [2] article, is shown below.

Table 1

Values of the approximation parameters and errors for the fractional analogue of the Kelvin model

σ_0, MPa	α	E_1, MPa	E_2, MPa	η	Δ, %
4,655	0,355	145,525	1163,800	190,067	2,586
6,288	0,326	133,601	898,329	158,793	4,097
8,738	0,394	140,194	1028,000	128,956	3,168
10.372	0,318	97,571	829,733	158,840	3,468
12.005	0,400	127,962	857,500	113,856	3,121

If there is only one table, then it may not be numbered, as in the following example.

Table

Values of the approximation parameters and errors for the fractional analogue of the Kelvin model

σ_0, MPa	α	E_1, MPa	E_2, MPa	η	Δ, %
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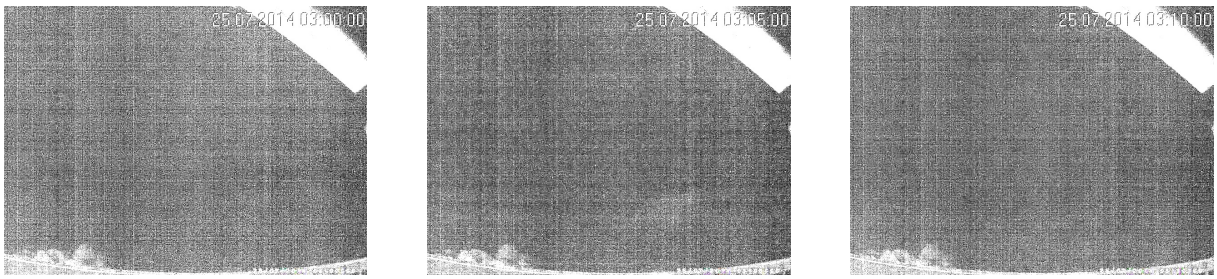
12.005	0,400	127,962	857,500	113,856	3,121

An example of the design of several figures in one (Fig. 1), taken from the article [8].



a) b) c)

Figure 1. Local glow visible from Hasanya, corresponding to the maximum period (03:05) of the local eastern electric jet: a) 03:00, b) 3:05 LT, c) 03:10. The photo was taken with a Cs265 camcorder, used in black and white resolution in the "night" mode. Brightness increased 15 times

An example of using a vector drawing in the format eps, is shown in Fig. 2.

About the list of references

The `mfit-bib-en.sty` package is used to format the bibliography in our journal. This package "— a modification of the `amsbib.sty` package, which is located on the site Math-Net.Ru Therefore, for the `mfit-bib-en.sty` package, all the examples given in the manual for the `amsbibs.sty` package are correct.

We ask you to provide verified information in the list of references. Do not cite sources that are difficult to find, for example, conference abstracts, preprints that do not have an electronic version on the Internet. Also, we do not recommend providing links to web resources that are not scientific journals.

Try to include original, not translated literature in the list of references. If Russian-language sources have a translation into English, or they have official meta-data in English, then give them.

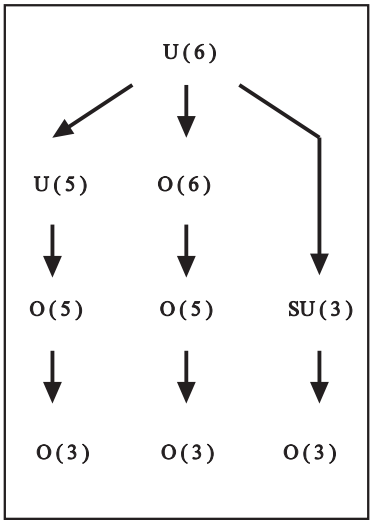


Figure 2. This is the caption of the figure

If you refer to an article posted on the portal Math-Net.Ru, then you can safely copy its citation from the portal in the format `amsbib.sty`. If you know DOI (Digital Object Identifier) for articles from your bibliography, be sure to include them.

Remark 3. It should be noted that the list of references should contain more than 10 and less than 50 references for scientific articles and less than 30 % of references to their own works.

Remark 4. It should be noted that the bibliography must be prepared using the above package `mfit-bib-en` in the `\begin{thebibliography} \end{thebibliography}` environment. Examples of the formation of bibliography are given below.

Remark 5. Note that if an article is written in Russian and it does not have a parallel translation into English, then the design of such an article has the form, for example, in the English-language [1] with the indication In Russian. The name of the journal is given in transliteration, and the English-language title of the article is taken from the translation of the metadata of the same article in the journal. If the article has a parallel translation, the output data of the translated article without specifying In Russian is indicated in the English version, as well as the English name of the journal ([11]). For Russian-language books, it is necessary to transliterate the title of the book in the English-language part, and then indicate the title in English in quadrant brackets. At the end of the link, be sure to indicate In Russian. Conference materials ([9].

Conclusion

At the end of the article there is a section "Conclusion", which should reflect the conclusions of the research in the article. Here you need to give a brief formulation of the results of your research, as well as indicate a possible continuation of research or development of your article.

After this section (before the bibliography), it is necessary to reflect competing interests in authorship and publication, as well as the author's contribution and responsibility for submitting the final version of the article to print.

Examples of the contents of these sections are shown below.

Competing interests. The authors declare that there are no conflicts of interest regarding authorship and publication.

Contribution and Responsibility. All authors contributed to this article. Authors are solely responsible for providing the final version of the article in print. The final version of the manuscript was approved by all authors.

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Do not forget after the list of references to provide information about the authors, indicating the full name, academic degree, title, position and place of work, **it is necessary to indicate the ORCID**, as well as attach a good quality photo.

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