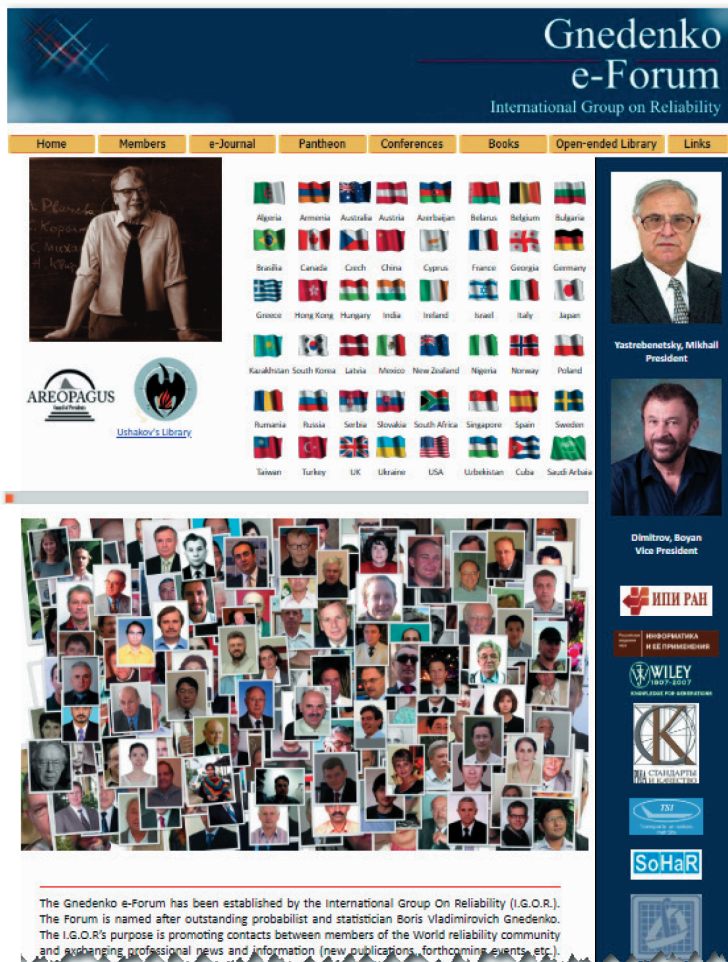




GNEDENKO FORUM

INTERNATIONAL GROUP ON RELIABILITY



The Gnedenko Forum was founded in 2004 by an unofficial international group of experts in the dependability theory for the purpose of professional support of researches from all over the world who are interested in studying and developing the scientific, technical and other aspects of the dependability theory, risk analysis and safety in the theoretical and practical domains.

The Forum exists on the Internet as a non-for-profit organization. It aims to involve into joint discussion and communication technical experts interested in developing the dependability theory, safety and risk analysis regardless of their home country and membership in whichever organization.

The Forum acts as an impartial and neutral entity that delivers scientific information to the press and public as regards the matters of safety, risk analysis and dependability of complex technical systems. It publishes reviews, technical documents, technical reports and research essays for the purpose of dissemination of knowledge and information.

The Forum is named after Boris V. Gnedenko, an outstanding Soviet mathematician, expert in the probability theory and its applications, member of the Ukrainian Academy of Sciences. The Forum is the platform for distribution of information on educational grants, academic and professional positions related to dependability, safety and risk analysis all over the world.

Currently, the Forum has 500 members from 47 countries.

Since January 2006, the Forum has been publishing its quarterly journal, Reliability: Theory & Applications (www.gnedenko.net/RTA). The Journal is registered in the Library of Congress (ISSN 1932-2321) and publishes articles, reviews, memories, information and literature references regarding the theory and application of dependability, survivability, maintenance, risk analysis and management methods.

Since 2000, the Journal is indexed in Scopus.



Membership in the Gnedenko Forum does not imply any obligations. It is only required to send your photograph and a brief professional biography (resume) to a.bochkov@gmail.com. Templates can be found at <http://www.gnedenko.net/personalities.htm>.

www.gnedenko.net

DEPENDABILITY JOURNAL ARTICLE SUBMISSION GUIDELINES

Article formatting requirements

Articles must be submitted to the editorial office in electronic form as a Microsoft Office Word file (*.doc or *.docx extension). The text must be in black, on a A4 sheet with the following margins: 2 cm for the left, top and bottom margins; 1.5 or 2 cm for the right margin. An article cannot be shorter than 5 pages and longer than 12 pages (can be extended upon agreement with the editorial office). The article is to include the structural elements described below.

Structure of the article

The following structural elements must be separated with an *empty line*. Examples of how they must look in the text are shown *in blue*.

1) Title of the article

The title of the article is given in the English language.

Presentation: The title must be in 12-point Times New Roman, with 1.5 line spacing, fully justified, with no indentation on the left. The font face must be bold. The title is not followed by a full stop.

An example:

Improving the dependability of electronic components

2) Author(s)' name.

This structural element for each author includes:

In English: second name and first name as "First name, Second name" (John Johnson).

Presentation: The authors' names must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be bold. The authors' names are separated with a comma. The line is not followed by a full stop.

An example:

John Johnson¹, Karen Smith^{2*}

3) The author(s)' place of employment

The authors' place of employment is given in English. Before the place of employment, the superscripted number of the respective reference to the author's name is written.

Presentation: The reference to the place of employment must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be normal. Each place of employment is written in a new line. The lines are not followed by a full stop.

An example:

¹ Moscow State University, Russian Federation, Moscow

² Saint Petersburg Institute of Heat Power Engineering, Russian Federation, Saint Petersburg

4) The e-mail address of the author responsible for maintaining correspondence with the editorial office

Presentation: The address must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be normal, all symbols must be lower-case. Before the address reference, symbol * is written. The title is not followed by a full stop.

An example:

*johnson_j@aaa.net

5) Abstract of the article

This structural element includes a structured summary of the article with the minimal size of 350 words and maximum size of 400 words. The abstract is given in the English language. The abstract must include (preferably explicitly) the following sections: Aim; Methods; Results/Findings; Conclusions. The abstract of the article should not include newly introduced terms, abbreviations (unless universally accepted), references to literature.

Presentation: The abstract must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be normal, except "**Abstract**", "**Aim**", "**Methods**", "**Conclusions**", that (along with the full stop) must be in bold. The text of the abstract must not be paragraphed (written in a single paragraph).

An example:

Abstract. Aim. Proposing an approach ... taking into consideration the current methods. **Methods.** The paper uses methods of mathematical analysis, ..., probability theory. **Results.** The following findings were obtained using the proposed method ... **Conclusion.** The approach proposed in the paper allows...

6) Keywords

5 to 7 words associated with the paper's subject matter must be listed. It is advisable that the keywords complemented the abstract and title of the article. The keywords are written in English.

Presentation: The text must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be normal, except “**Keywords:**” that (along with the colon) must be in bold. The text must not be paragraphed (written in a single paragraph). The text must be followed by a full stop.

An example:

Keywords: dependability, functional safety, technical systems, risk management, operational efficiency.

7) Text of the article

It is recommended to structure the text of the article in the following sections: Introduction, Overview of the sources, Methods, Results, Discussion, Conclusions. Figures and tables are included in the text of the article (the figures must be “In line with text”, not “behind text” or “in front of text”; not “With Text Wrapping”).

Presentation:

The titles of the sections must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be bold. The titles of the sections (except the Introduction and Conclusions) may be numbered in Arabic figures with a full stop after the number of a section. The number with a full stop must be separated from the title with a no-break space (Ctrl+Shift+Spacebar).

The text of the sections must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with a 1.25-cm indent. The font face must be normal. The text of the sections must be paragraphed. There must be no indent in the paragraph that follows a formula and contain notes to such formula, e.g.:

where n is the number of products.

An example:

1. State of the art of improving the dependability of electronic components

An analysis of Russian and foreign literature on the topic of this study has shown that ...

Figures (photographs, screenshots) must be of good quality, suitable for printing. The resolution must be at least 300 dpi. If a figure is a diagram, drawing, etc. it should be inserted into the text in editable form (Microsoft Visio). All figures must be captioned. Figures are numbered in Arabic figures in the order of their appearance in the text. If a text has one figure, it is not numbered. References to figures must be written as follows: “Fig. 3. shows that ...” or “It is shown that ... (see. Fig. 3.)” The abbreviation “Fig.” and number of the figure (if any) are always separated with a no-break space (Ctrl+Shift+Spacebar). The caption must include the counting number of the figure and its title. It must be placed a line below the figure and center justified:

Fig. 2. Description of vital process

Captions are not followed by a full stop. *With center justification there must be no indent!* All designations shown in figures must be explained in the main text or the captions. The designations in the text and the figure must be identical (including the differences between the upright and oblique fonts). *In case of difficulties with in-text figure formatting, the authors must – at the editorial office’s request – provide such figures in a graphics format (files with the *.tiff, *.png, *.gif, *.jpg, *.eps extensions).*

The tables must be of good quality, suitable for printing. The tables must be editable (not scanned or in image format). All tables must be titled. Tables are numbered in Arabic figures in the order of their appearance in the text. If a text has one table, it is not numbered. References to tables must be written as follows: “Tab. 3. shows that ...” or “It is shown that ... (see. tab. 3.)” The abbreviation “tab.” and number of the table (if any) must be always separated with a no-break space (Ctrl+Shift+Spacebar). The title of a table must include the counting number and its title. It is placed a line above the table with center justification:

Table 2. Description of vital process

The title of a table is not followed by a full stop. *With center justification there must be no indent!* All designations featured in tables must be explained in the main text. The designations in the text and tables must be identical (including the differences between the upright and oblique fonts).

Mathematical notations in the text must be written in capital and lower-case letters of the Latin and Greek alphabets. Latin symbols must always be oblique, except function designators, such as sin, cos, max, min, etc., that must be written in an upright font. Greek symbols must always be written in an upright font. The font size of the main text and mathematical notations (including formulas) must be identical; in Microsoft Word upper and lower indices are scaled automatically.

Formulas may be added directly into the text, for instance:

Let $y = a \cdot x + b$, then ...,

or written in a separate line with center justification, e.g.:

$$y = a \cdot x + b.$$

In formulas both in the text, and in separate lines, the punctuation must be according to the normal rules, i.e. if a formula concludes a sentence, it is followed by a full stop; if the sentence continues after a formula, it is followed by a comma (or no punctuation mark). In order to separate formulas from the text, it is recommended to set the spacing for the formula line 6 points before and 6 points after). If a formula is referenced in the text of an article, such formula must be written in a separate line with the number of the formula written by the right edge in round brackets, for instance:

$$y = a \cdot x + b. \quad (1)$$

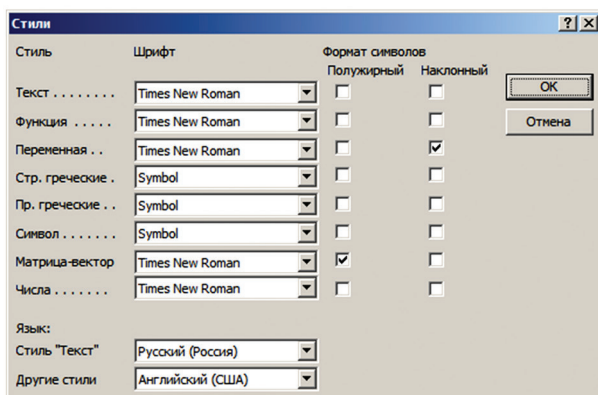
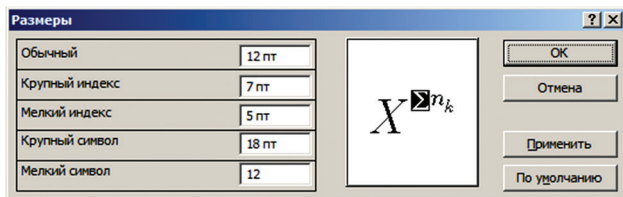
If a formula is written in a separate line and has a number, such line must be right justified, and the formula and its number must be tab-separated; tab position (in cm) is to be chosen in such a way as to place the formula roughly at the center. Formulas that are referenced in the text must be numbered in Arabic figures in the order of their appearance in the text.

Simple formulas should be written without using formula editors (in MS Word, Latin should be used, as well as the “Insert” menu + “Special Characters”, if Greek letters and mathematical operators are required), while observing the required slope for Latin symbols, for example:

$$\Omega = a + b \cdot \theta.$$

If a formula is written without using a formula editor, letters and +, −, = signs must be separated with no-break spaces (Ctrl+Shift+Spacebar).

Complex formulas must be written using a formula editor. In order to avoid problems when editing and formatting formulas it is highly recommended to use Microsoft Equation 3.0 or MathType 6.x. In order to ensure correct formula input (symbol size, slope, etc.), below are given the recommended editor settings.



When writing formulas in an editor, if brackets are required, those from the formula editor should be used and not typed on the keyboard (to ensure correct bracket height depending on the formula contents), for example (Equation 3.0):

$$Z = \frac{a \cdot \left(\sum_{i=1}^n x_i + \sum_{j=1}^m y_j \right)}{n + m}. \quad (2)$$

Footnotes in the text are numbered with Arabic figures, placed page by page. Footnotes may include: references to anonymous sources on the Internet, textbooks, study guides, standards, information from websites, statistic reports, publications in newspapers, magazines, autoabstracts, dissertations (if the articles published as the result of thesis research cannot be quoted), the author's comments.

References to bibliographic sources are written in the text in square brackets, and the sources are listed in the order of citation (end references). The page number is given within the brackets, separated with a comma and a space, after the source number: [6, p. 8].

8) Acknowledgements

This section contains the mentions of all sources of funds for the study, as well as acknowledgements to people who took part in the article preparation, but are not among the authors. Participation in the article preparation implies: recommendations regarding improvements to the study, provision of premises for research, institutional supervision, financial support, individual analytical operations, provision of reagents/patients/animals/other materials for the study.

Presentation:

The information must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be normal.

9) References

The References must include only peer-reviewed sources (articles from academic journals and monographs) mentioned in the text of the article. It is not advised to references autoabstracts, dissertations, textbooks, study guides, standards, information from websites, statistic reports, publications in newspapers, websites and social media. If such information must be referred to, the source should be quoted in a footnote.

The description of a source should include its DOI, if it can be found (for foreign sources, that is possible in 95% of cases).

References to articles that have been accepted, but not yet published must be marked “in press”; the authors must obtain a written permission in order to reference such documents and confirmation that they have been accepted for publication. Information from unpublished sources must be marked “unpublished data/documents”; the authors also must obtain a written permission to use such materials.

References to journal articles must contain the year of publication, volume and issue, page numbers.

The description of each source must mention all of its authors.

The references, imprint must be verified according to the journals' or publishers' official websites.

Presentation:

References must be written in accordance with the Vancouver system.

The references must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with a 1.25-cm indent on the left. The font face must be normal. Each entry must be numbered in Arabic figures with a full stop after the number. The number with a full stop must be separated from the entry with a no-break space (Ctrl+Shift+Spacebar).

10) About the authors

Full second name, first name (in English); complete mailing address (including the postal code, city and country); complete name of the place of employment, position; academic degree, academic title, honorary degrees; membership in public associations, organizations, unions, etc.; official name of the organization in English; e-mail address; list and numbers of journals with the author's previous publications; the authors' photographs for publication in the journal.

Presentation:

The information must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be normal.

11) The authors' contribution

Detailed information as to each author's contribution to the article. For example: Author A analyzed literature on the topic of the paper, author B has developed a model of real-life facility operation, performed example calculation, etc. Even if the article has only one author, his/her contribution must be specified.

Presentation:

The information must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be normal.

12) Conflict of interests

A conflict of interests is a situation when people have conflicting and competing interests that may affect editorial decisions. Conflicts of interests may be potential or conscious, as well as actually existing. The objectivity may be affected by personal, political, financial, scientific or religious factors.

The author must notify the editorial office on an existing or a potential conflict of interests by including the corresponding information into the article.

If there is no conflict of interests, the author must also make it known. An example of wording: "The author declares the absence of a conflict of interests".

Presentation:

The text must be in 12-point Times New Roman, with a 1.5-line spacing, fully justified, with no indentation on the left. The font face must be normal.

SUBSCRIPTION TO THE JOURNAL «DEPENDABILITY»

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Application of machine learning methods for predicting hazardous failures of railway track assets

Igor B. Shubinsky*, Alexey M. Zamyslov*, Olga B. Pronovich*, Alexey N. Ignatov*, E. N. Ignatov
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Abstract. The aim of the paper is to reduce the number of hazardous failures of railway track assets by developing a method of prediction of rare hazardous failures based on the analysis of the amount of data on each kilometre of track obtained in real time. Hazardous failures are rare events; the set of variable values of the number of hazardous failures per year is in the domain of the transition from the estimation of the probability of hazardous failure of the track to the estimation of the probability of hazardous failure of the track. The problem of hazardous failures of railway track assets is solved by conventional means. Hazardous events are predicted using the above statistics and artificial neural networks. Such technology includes methods of machine learning and data science. The application of various algorithms of machine learning and data science is demonstrated using the example of prediction of track superstructure failures. The result of facility making is the conclusion regarding the hazardous failure of railway track. That conclusion is based on the comparison of the actual characteristics of an item and conditions of its operation with the characteristics of an item and conditions of its operation. The practical value of the proposed set of methods and means can be used in the track maintenance decision-making system. It can be easily adapted and integrated into the automated measurement system installed on the track.

Keywords: machine learning, railway track facility failure, decision tree

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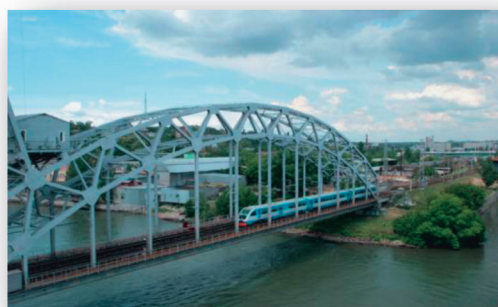
□ safety,

□ reliability



Key areas of activity

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- Automated transportation management centers
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