



## О P I N I O N

on the thesis for obtainment of the educational and scientific degree „**Doctor**”

professional field **4.6. Informatics and computer sciences**

scientific specialty „**Informatics**”

Author of the thesis: Stefan Kostadinov Stefanov

Thesis title: **INNOVATIVE METHODS TO SUPPORT DECISION-MAKING IN WILD LAND FIRES OR FLOODS**

Member of the scientific panel: Prof. Dr. Petia Doycheva Koprinkova-Hristova

I was appointed as a member of the Scientific panel on the procedure for obtainment of the educational and scientific degree “doctor” by Stefan Kostadinov Stefanov with the order №132/01.06.2021 of the Director of IICT-BAS. As panel member I received the following documents:

1. PhD thesis
2. Abstract of the thesis in Bulgarian and English language
3. Check up for fulfilment of the minimal demands of IICT-BAS
4. Copies of the publications of the candidate and other documents related to the procedure.

The PhD thesis consists of 122 pages, 57 figures, 5 tables and 6 appendices. It contains introduction, four chapters, conclusions, declaration for originality of the results, list of papers on the thesis topic and references. Totally 107 literature sources were cited, 26 of them in Bulgarian language and rest – in English language, including four papers by the candidate.

The abstract reflects in summary faithfully all major parts of the thesis. It consist of 25 pages in Bulgarian language and of 27 pages in English language.

The problem under consideration in the thesis is undoubtedly topical since it is related to the support of duly decision making aimed at overcoming the consequences of frequent nowadays natural disasters such as fires and floods.

The candidate demonstrates deep knowledge on the state of the art presenting an analytical review of the data about occurred fires and floods worldwide and in Bulgaria as well as of the methods for modelling of these multiplied natural disasters and of the existing GIS and the contemporary software technologies applied for their development. The PhD student defines clearly the unsolved problems thus motivating the tasks of his PhD thesis and the methods for their achievement.

The thesis contributions can be classified as scientific applications. In summary they are:

1. Based on analytical analyses of the existing commercial GIS and such with open code a platform (open code GIS) was chosen and an algorithm for development of open code information systems supporting decision making in case of forest fires or floods was proposed.
2. A methodology for work with real data visualizing parameters such as relief, meteorology, plant species and water resources based on known from literature mathematical models was developed.
3. Two web-based GIS platforms supporting decision taking in case of forest fires and floods were developed.
4. The developed GIS were applied in practice:
  - GIS supporting decision taking in operative room in case of forest fires in Governmental Forestry “Zlatograd”
  - GIS supporting decision taking in operative room in case of floods for a test zone in Armenia

Especially good impression makes the fact that the work of the candidate found real applications not only in Bulgaria but as well as abroad that are related to his participation in two international scientific projects.

The candidate submitted 4 papers on the thesis topic, two of them referenced in Scopus in editions with SJR that gain totally 40 points and two at international scientific conferences not referenced or indexed in worldwide famous scientific data bases that does not gain points. Three of the papers are co-authored with the candidates’ supervisor and one of the presented at international conference paper is authored only by the PhD student. Thus the candidate fulfills and surpasses the minimal demands of IICT of 30 points in section Γ of the scientific measuring indicators.

Two certificates for attendance of training courses on Copernicus program and ESA as well as a charter for excellent scientific achievements in PhD category for 2019 by IICT-BAS were enclosed as additional materials that is yet another proof of the quality of the PhD student’s work.

I have several remarks on the technical presentation of the thesis: the Greek letter  $\rho$  was used in equations (4) and (6) instead of previously used in equations (1) and (3) Latin letter  $q$ ; in section 1.5, page 31 Figure 1.10 is wrongly mentioned instead of 1.11; the notions on Figure 4.8 numbered from 1 to 12 are described in the next as a list without numbers; on the references sources 4 and 69 are of the same paper and source 79 is not mentioned in the text; I’ve found also some grammatical errors such as missing commas and incorrect usage of nominative and non-nominative article cases.

All of these does not deprecate candidate’s contributions. I recommend him to continue working in this undoubtedly topical area with big practical importance.

The candidate fulfils all demands of the Law for scientific development of the academic staff for achievement of the educational and scientific degree “Doctor”. In conclusion, I give **positive assessment** of the PhD thesis.



All aforementioned gives me a reason to recommend to the members of the Scientific panel to confer on **Stefan Kostadinov Stefanov** the educational and scientific degree “**Doctor**” in professional field **4.6. Informatics and computer sciences, scientific speciality „Informatics”**.

Date: 27.08.2021



(Prof. P. Koprinkova-Hristova)