

SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT
Action number: CA15140

STSM title: “Humans brain inspired optimization model applied on river development”

STSM start and end date: 01/03/2019 to 30/03/2019

Grantee name: Svetlana Stevovic

The purpose of this STSM is to improve applicability of nature inspired optimization models and to propose the adequate one, which will be acceptable and useful for decision makers, scientists and engineers, in the fields of Renewable Hydro Energy production optimization and in the function of maximum environmental protection.

The work carried out during the STSM can be specified within next 7 steps:

1. The harmonization of the date, administrative procedure, scientific methods and goals with the host
2. The preparation of input data for the optimization model
3. The change of the input data when the results were not in the satisfied range
4. The discussion and adoption of the adequate model for selected case study of the river
5. The development and improvement of selected nature inspired optimization model
6. The evaluation of the results and correctness of the model
7. The preparation of the paper for the conference

All this was done in order to achieve the purpose of the STSM.

Research on improving of applicability of nature inspired optimization was conducted on one interesting case studies from the renewable energy production practice relating to the problem of optimization of hydro potential. The work in detail carried out before and during the STSM consisted of next activities and it is presented by the list below:

1. Administrative adjustment of timing, travelling, accommodation, and complete organization of STSM
2. General adjustment of STSM subject, research methods, scope of the research and expected goals
3. Travelling to Host institution - Institute for Technical Sciences BiH
4. Issuing of the necessary identification Institute for Technical Sciences security and working cards
5. Selection of case study from the field of hydro renewable energy production
6. Final definition of the case study representative for the research in applicability of nature inspired optimization models
7. The problem description
8. Final definition of the goals
9. Definition of the input variables and input data
10. Definition of the limits and constrains
11. Theoretical analyses of the case study main characteristic

12. Analyses of possible nature inspired optimization model to be applied to selected case study
13. Adoption and application of the most adequate nature inspired optimization model
14. Results evaluation
15. Analyses of the results sensitivity to the changing of input variables
16. Tuning of the nature inspired optimization model
17. Acceptance of the final results
18. Final analyses of the synergy between the theory and practice
19. Conclusions on the improvement of applicability of the selected nature inspired optimization model in particular case study and its contribution to environmental protection
20. Writing of the paper for the conference
21. Final preparation of the Report and travelling back to Home institution

The main result obtained within this STSM was in preparing a scientific paper, which is published on the conference SDEWES. This paper presents the main results during the STSM. The research was so interesting that the organizers of the conference took it as Keynote presentation. The title of the presentation was: “Water accumulation as energy storage, conflicting purposes and nature inspired optimization modelling”. The abstract is in the attachment. The paper is invited for publishing on SCI list.

The COST participant learned the newest nature inspired optimization techniques applied at the Institute for Technical Sciences. Also, the participant worked with software and with equipment on Institute for Technical Sciences, which present the dissemination of the Institute of Technical Sciences newest scientific results and improvement of participant knowledge.

The participant of STSM and the researcher from the host institution established strong collaboration, which will be useful for both parties in the future, as well as for CA.