Responses to the comments of reviewers for the Parallel DE

# Reviewer 1

## 1. Comment

Equation (1) must be ended with point.

## RESPONSE

Done

## 2. COMMENT

The Abstract should contain answers to the following questions: What problem was studied and why is it important? What methods were used? What are the important results? What conclusions can be drawn from the results? What is the novelty of the work and where does it go beyond previous efforts in the literature?

## RESPONSE

The abstract have been modified to the following:

“*Global optimization is a widely used technique that finds application in many sciences such as physics, economics, medicine, etc. and with many extensions as for example in the area of machine learning. However, in many cases global minimization techniques require high computational time and for this reason parallel computational approaches should be used. In this paper, a new parallel global optimization technique based on the differential evolutionary method is proposed. This new technique uses a series of independent parallel computing units that periodically exchange the best solutions they have found. Additionally, a new termination rule is proposed here that exploits parallelism to accelerate process termination in a timely and valid manner. The new method was applied to a number of problems in the established literature and the results were quite promising.*”

## 3. COMMENT

Equation (2) must be ended with comma.

## RESPONSE

Done.

## 4. COMMENT

The authors are requested to add more details regarding their original contributions in this manuscript.

## RESPONSE

(na grafei giati einai diaforetiko apo alla island models)

## 5. COMMENT

Papers cited in references section must be rewritten according to journal style before further process.

## RESPONSE

(na grafei sto style tou MDPI)

## 6. COMMENT

This paper should be polished in grammatical frame.

## RESPONSE

(na perasei apo grammar check)

## 7. COMMENT

Equation (4) must be ended with comma.

## RESPONSE

Done.

# Reviewer 2

## 1. COMMENT

How does the proposed parallel algorithm differ from the classical island model of the evolutionary algorithm known for many years?

## RESPONSE

(Diaferei giati proteinei diafores texnikes gia propagation, exei kalytero weight scheme, exei mia methodo termatismou ftiagmeni gia parallila perivallonta sta opoia o termatismos mporei na apofasizetai apo mia merida ton nision)

## 2. COMMENT

What are the advantages of applying the presented approach to the construction of the parallel Differential Evolution algorithm in comparison to other approaches to the construction of such an algorithm cited in the text?

## RESPONSE

(edo prepei na grafei pos exei kalytero scheme gia to differential weight, enan beltiomeno kanona termatismo pou exei kiolas enisxuthei oste na doyleyei kalytera se parallila periballonta. Episis i proteinomeni texniki proteinei mia seira apo propagation methods )

## 3. COMMENT

Why are there no comparisons with other versions of the parallel Differential Evolution algorithm in the results of the experiments? Maybe then you would see some of its advantages compared to other algorithms because currently it is not clear what its advantages and disadvantages are.

## RESPONSE

The proposed method has been compared against the original DE method and two variants from the relevant literature and the results are shown in the Table 4 of the revised manuscript. The added text reads:

“Furthermore, the proposed method was compared against the original Differential Evolution method and two variants from the relevant literature mentioned as DERL and DELB[[de\_kaelo](#LyXCite-de_kaelo)]. The results from this comparison are shown in the Table [tab:deVariants](#tab_deVariants). As is evident, the proposed technique significantly outperforms the other modifications of the different evolutionary method. This is largely due to the different differential weight calculation technique but also to the proposed method termination methodology. The used differential weight calculation technique largely succeeds in making a better search of the search space, while the new termination method terminates the optimization method in time. Also, this new termination technique has been modified to perform well in parallel computing environments as well.”

## 4. COMMENT

What results are shown in tables 2 and 3? This should be described in the titles of the tables.

## RESPONSE

The title of Table 2 has been changed to:

“*Comparison of experimental results with “1 to 1” propagation scheme. The first column represents the name of the objective function and the remaining columns are the average function calls using 1 to 10 processing threads for the proposed method*”

The title of Table 3 has been altered to:

“*Experiments for the proposed method using different options for the propagation method. The number of processing threads was set to 10. Numbers in cells represent average function calls for every test function.*”

## 5. COMMENT

Are these average results from multiple runs of the algorithm? There is also no statistical analysis of the results obtained.

## RESPONSE

# Reviewer 3

## 1. COMMENT

The original DE method. What are the input and output variables of this algorithm? INPUT: … OUTPUT.

## RESPONSE

We have rewrite the algorithm of the original DE method according to this comment.

## 2. COMMENT

Same descriptions for the algorithm, presented in section “2.2 Proposed modifications”.

## RESPONSE

Done.

## 3. COMMENT

Description of Equation (4). What is this “R” something like correction factor. You have to describe it. Na matter that you show literature sources [58].

## RESPONSE

The following text has been added:

“*This random scheme for the calculation of the parameter F was used successfully to better explore the search space of the objective function.*”

## 4. COMMENT

Table 1. Are these values dimensionless?

## RESPONSE

We have added the corresponding information for each parameter in the table.

## 5. COMMENT

Figure 1. You have to add X and Y axis titles.

## RESPONSE

Done.

## 6. COMMENT

Page 8. Sinusoidal function. If “z” has a name, it will be good to write it.

## RESPONSE

The following text and an appropriate reference have been added:

*“**The parameter z is used to shift the location of the global minimum [*[*Sinu*](#LyXCite-Sinu)*].”*

## 7. COMMENT

Discussion part is missing. You have to compare your results with those from minimum 3 other papers.

## RESPONSE

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## 8. COMMENT

Conclusion part. It is not clear how your work improves the known solutions in this study area.

## RESPONSE