Nonlinear Processes
in Geophysics

Open Access

EGU

Discussions

Interactive comment on "Technique for solving for microseismic source location parameters based on adaptive particle swarm optimization" *by* Hong-Mei Sun et al.

Hong-Mei Sun et al.

jrs716@163.com

Received and published: 2 June 2019

Response to Comments

Journal: NPG

Title: Technique for solving for microseismic source location parametersbased on adaptive particle swarm optimization

Author(s): Hong-Mei Sun et al.

MS No.: npg-2019-11

MS Type: Research article

Corresponding author: Dr. Rui-Sheng Jia

E-mail:jrs716@163.com

Dear Editors and Reviewers,

On behalf of my co-authors, we thank you very much for giving us an opportunity to revise our manuscript, we appreciate editor and reviewers very much for their positive and constructive comments and suggestions on our manuscript.

We have studied comments carefully and have made correction which we hope meet with approval. Attached please find the revised version, which we would like to submit for your kind consideration. We would like to express our great appreciation to you and reviewers for comments on our paper. Looking forward to hearing from you.

Thank you and best regards!

Yours sincerely,

Rui-Sheng Jia

E-mail: jrs716@163.com

Referee #1:

Comments from Referees: My issues mainly concern the necessity of clarifying in a more detailed way someconcepts and analyses: - Some terms in the equations are not defined; - Confusionin discrimination between dimension of particle space and number of particles in theswarm; - It is not explained how the initial values in the Geiger's method were chosen;- The analysis about the influence of lack of knowledge on velocity model has to be described more thoroughly; In addition, it is very important to cite other works that could be easily found and read by the scientific community. Actually, many works cited in the introduction which could help to better contextualize the problem

are very difficult to find. I also noticed some typos in the manuscript. Since I am not English mother tongue, I suggest a potential revision of the manuscript with the support of Editorial office. Anyway, I provide you a line-by-line commented pdf version of the manuscript with some suggestions for improving it. Best regards. Please also note the supplement to this comment: https://www.nonlin-processes-geophys- discuss. net/npg-2019-11/npg-2019-11-RC1-supplement.pdf

Author's response: Thank you for your careful review and good suggestions.

Author's changes in manuscript: We answered the questions one by one and revised the paper in accordance with comments pdf. We tried our best to improve the manuscript and made some changes in the manuscript. These changes will not influence the content and framework of the paper, and here we did not list the changes but marked in red in revised paper. Once again, thank you very much for your comments and suggestions.

Referee #2: Q1: Title: "Technique for solving for microseismic source location parameters based on adaptive particle swarm optimization" Suggested title: "The adaptive particle swarm optimization technique for solving microseismic source location parameters" (this is optional)

Author's response: Thank you for your good advice.

Author's changes in manuscript: We have revised the title according to your suggestion.

Q2: Page#2 Line#2: Please correct this reference "Lomax et al., 2011" with correct one "Lomax et al., 2001".

Author's response: We are very sorry for our incorrect writing.

Author's changes in manuscript: We have corrected the relevant errors according to your prompt.

Q3: Abstract OK (clear and concise (coherent) presentation, international standard

write) 1.Introduction - OK. Overview well described with references. 2.Microseismic source location principle - OK, concise, and clear. 3. Adaptive PSO algorithm for solving location parameters - OK 4. Simulation and case study - OK (more attention on errors techniques, because it builds conclusion #3) 5. Conclusions - OK (check conclusion #3, according precision) References - OK, written correct, clear, unique format. No skipped references in text or missing articles in the reference section according to the text. Tables and Figures are OK.

Author's response: Thank you for giving us credit for our manuscript!

Author's changes in manuscript: No modification.

Q4: Remarque for location accuracy: According to the conclusion #3, less errors on the location computations are provided by PSO method than LSM. Here, I would like to ask authors for completing following: 1. Case study 4.2: Blast's points A and B have precision on XYZ coordinates dXYZ=0.1m, by default or for some measurement reasons ? (This is first question, which need to be answered with more details on coordinate positioning errors / GPS, or other).

Author's response: The XYZ coordinates and accuracy of the blasting point are given by mine surveyors, who use conventional mine survey methods to determine the blasting point without using GPS measurement.

Author's changes in manuscript: No modification.

Q5: 2. The finite dimension of Blast point: depends what you have used in mines (dynamite, or other..) it should have some volume in space. This gives some uncertainties on wave propagation, because still have no idea through which side of this cube/cylinder/or sphere, the wave goes out and made shock source. This is unknown, and this is the real source errors on locations, here. (My second question is how big was the real source ? - the volume, which can gives you real dXYZ=?)

Author's response: This is really a very professional problem. Our experiment was

carried out in the advance roadway of the coal mine working face. The diameter of the borehole is 42 mm, the depth of the hole is 1.2 m, and the length of the filled explosive is 1/4 of the hole depth. We approximate the blasting point to a spherical blasting point without considering the error you mentioned. However, your suggestions are very valuable for fine research on microseismic source location, and we will do further research according to your ideas.

Author's changes in manuscript: No modification

Q6: 3. The above 2 answers give the real positioning of source. Here, need to check the computed errors from their computing formula (for location parameters of the source) by each method and compare it with real errors. Then compare between and say can you distinguish (according the existing precision) which ones gives more appropriate results with real location ? Are really PSO better than LSM ? From my point of view,this question is still open, and need attention for completing.

Author's response: Yes.

Author's changes in manuscript: Limited to the length of the paper, we did not write these error analysis into the manuscript, but in part 4.2, we added relevant instructions. For details, please refer to P14, L3-L5(1st-Revised manuscript(Marked with red).pdf).

We tried our best to improve the manuscript and made some changes in the manuscript. These changes will not influence the content and framework of the paper. And here we did not list the changes but marked in red in revised paper.

Please also note the supplement to this comment:
https://www.nonlin-processes-geophys-discuss.net/npg-2019-11/npg-2019-11-AC1-supplement.zip

---