Ref: npg-2019-36

Title: BP Neural Network and improved Particle Swarm Optimization for Transient Electromagnetic Inversion

Journal: Nonlinear Processes in Geophysics

Dear Editor,

I appreciate the author's effort on the paper. However, the paper requires a revision considering my comments given below.

Comments

1. Page 2, line 53 → Please provide a correct reference name for Fernndez et al. (2010).
2. Page 6, line 136 → There is no T_k and O_k terms in equation 14. In addition, is there no unit for the training error value calculated?
3. Page 7, line 148 → use slightly better instead of litter better.
4. Do you have any experimental studies (i.e., parameter tuning) for the PSO parameters used in the study?
5. The sentence given below requires a reference.
   "*Comparing to the standard PSO (SPSO), a chaotic oscillation inertia weight PSO (COPSO) which can accelerate the convergence rate in the early stage was proposed naturally*."
   The inertia weight value used in SPSO-BP approach is not clear in the text. Based on my experiments for parameter estimation from geophysical anomalies (e.g., self-potential, gravity, magnetic) using PSO algorithm, the values including 2.041 (c_1), 0.948 (c_2) and 0.729 (ω) proposed by Carlisle and Dozier (2001) mainly provide quite efficient results. Please provide a comparison.
6. Considering the results presented in Table 2 and Fig.3, is there a possibility to use the same initial population during the evaluation process to provide a good comparison?
7. Please use more proper terms in the text regarding a geophysical optimization study (e.g., predict and desired outputs).
8. Please depict ω_s and ω_e inertia weight values in title of Table 3.
9. Use true values instead of reference value and theoretical curve instead of theory curve. In fact, I do not see any curve in Fig. 11. They represent layer parameters.

10. Please define PSO parameter values used in the synthetic case.
11. Please discuss the main advantages and disadvantages of the BP compared to the metaheuristic approaches requiring a parameter space which can be chosen
12. Such a study must include the effect of the noise on the solution in the synthetic case. Besides uncertainty analyses for estimated parameters should be applied for data sets with and without noise. A field example must be also presented.