

A new method for nonlinear geo-inversion: The one-dimensional case

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We propose a hybrid global optimization method for nonlinear nonconvex geo-inverse problems. The method consists of two basic components: local optimizers and feasible point finders. Local optimizers have been well developed in the literature of optimization, and almost always provide a local optimal solution. In this paper, we will focus on the one-dimensional case. Thus the feasible point finder is essentially equivalent to a zero-point finder for a nonlinear equation. It warrants that local optimizers either find the global optimal solution(s) or always produce a better improved local optimal solution. By assembling these two components together into a new global optimization method for nonlinear nonconvex inverse problems in the Earth Sciences, we are sure that all the global optimal solution(s) can be correctly found. The algorithm has been demonstrated with an example of nonlinear nonconvex cost function with more than 1,750,000 local minima. For more details about the new method, the reader is referred to the full paper which is now in press in *Journal of Computational and Applied Mathematics*.