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Inversion of self potential anomaly using particle swarm optimization method- A MATLAB environment

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The paper deals with a novel method based on Particle Swarm Optimization (PSO) of the inversion of geoelectrical single and multiple self potential (SP) data anomaly of idealized body. The PSO algorithm is inspired from the observations of the social behavior of animals, such as bird flocking or fish schooling. PSO is also a population based optimization algorithm like other evolutionary algorithms. In this method, members of the population are called as the swarm and each individual within the swarm is called as the particle. During the solution process, each particle in the swarm explores the search space through their current positions and physical property of earth. The PSO based algorithm is developed in MATLAB environment that made users friendly and runs the algorithm to produce the results more efficiently with optimal error. This also gives advantages over other conventional environment. In order to check the stability and accuracy of the algorithm, the developed algorithm is implemented and tested on synthetic SP data and finally applied to three field data from Bakreshwar thermal region and Surda region of India and Vilarehlo da Raia region of Portugal. The performances by PSO are compared with previous results and these results are well correlated with standard squared error. In general it is observed that the PSO method is faster and its performance is better compared to previous squared error without any initial assumptions of SP anomaly

Keywords: SP data, Inversion, PSO, MATLAB