Simultaneous Determination of Velocities and Thicknesses of Layered Model with Genetic Algorithm

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Layered velocity model is an important basis for seismology. Grid search and inversion are commonly used to determine a layered model. Grid search offers accurate solutions but usually takes much time calculating. On the contrary, inversion saves time but has the local minimum problem. Genetic algorithm (GA), which has been used in many fields, probably is a proper method to balance between accuracy and time saving. The purpose of our research was to determine velocities and thicknesses of layered velocity model simultaneously with GA method. In this study, P arrivals and S-P time differences were used. A Fortran computer code was written and tested with earthquake data of Chia-Yi area, Taiwan. The results showed that our approach is efficient and could be a good way to obtain a reliable initial velocity model for geophysical studies, especially when plenty of earthquake data involved.