AUTOMATIC SEARCH ALGORITHM FOR LOW CUT-OFF FREQUENCY FOR FILTERING STRONG-MOTION RECORDS

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Abstract

Aiming at the low efficiency of traditional methods to determine the low cut-off frequency in strong-motion records processing, we propose an automatic search model to determine the cut-off frequency of low-frequency filters and use the loss function in a statistical learning method to determine the end condition of the automatic search model flow. Based on strong-motion records obtained from the principal shocks and aftershocks of the 2008 Wenchuan earthquake and 2013 Lushan earthquake in China, we compare the computational result of the automatic search algorithm and the low cut-off frequency identified by the traditional method, analyze the errors of the automatic search algorithm, and propose theoretical principles and applicable conditions of their use. Experimental results indicate that the automatic search algorithm we proposed improves computational efficiency significantly compared to the traditional method. Particularly, our automatic search algorithm is suitable for processing strong-motion records in batches.

Keywords: strong-motion records; filter; low cut-off frequency; automatic search algorithm; loss function