應用進化演算法於跨河橋梁識別沖刷深度之研究

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摘要

In recent years, rapid climate change and frequent earthquakes have led to increasingly unstable geology at various locations, with disastrous consequences when the rains come. Moreover, fast-flowing rivers in Taiwan are the leading causes of scouring around bridge piers, which further endanger the safety and stability of bridges. This study applied the method of numerical simulation, with vehicle load serving as an external force, to construct a database of the dynamic responses of bridges to various vehicle speeds under differing scour depth conditions around bridge piers. Information on dynamic responses of bridges and vehicle speeds were entered into the back-propagation network to be trained to identify the scour depth around bridge piers. Using various combinations of independent variables, this study applied the construction method for determining the independent variables of the system, to improve the credibility of the results from these identifications. Based on these results from system identification, it was shown that the more one uses combinations of independent variables with highly correlated variables, the more one can use the linear regression analysis identification model in place of the non-linear back-propagation network identification model. In this study, estimation using such a regression analysis is able to identify the scour depth around bridge piers.

關鍵字：Back-Propagation Network, System Identification