

Simulation of Hyperbolic Stress-Strain Parameters of Soils Using Artificial Neural Networks

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Artificial Neural networks (ANNs) are one of the widely used modeling techniques during the last decade or so, which can approximate a non-linear relationship between input and output data sets. The use of artificial neural networks (ANNs) has increased in many areas of engineering. In particular, ANNs have been applied to many geotechnical engineering problems and have demonstrated some degree of success. In the present investigation, an attempt is made to predict hyperbolic stress-strain relationship parameters using multilayer perceptrons that are trained with back-propagation algorithm for estimating modulus number (k), modulus exponent (n) and the failure ratio (R_f). A database comprises a total of (83) case recorded are used to develop the ANN models. In addition, the paper discusses a number of issues in relation to ANN construction such as the effect of ANN geometry and internal parameters on the performance of ANN models. Practical equations for prediction of hyperbolic stress-strain relationship parameters are developed. It was found that ANNs have the ability to predict the hyperbolic stress-strain relationship parameters with a good degree of accuracy.