

A Novel Artificial Neural Network Scheme for Modelling of Nonlinear Soil Stress-Strain Modulus Exponent

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The principal aim of this study was to develop and verify a new Artificial Intelligence (AI) model to predict the hyperbolic soil stress-strain parameter, namely the modulus exponent (n). To achieve the planned aim, artificial neural network was developed and trained, additionally, it targeted to provide an appropriate empirical model to predict the parameter n with high efficiency. A database of laboratory measurements encompasses total of (83) case records for modulus exponent (n). Four input parameters namely: Dry unit weight, Plasticity index, Confining stress, and Water content, are considered to have the most substantial influence on the nonlinear soil stress strain relationship parameter, which are used as an individual input parameter to the developed the proposed ANN model. The output model is modulus exponent (n). Multi-layer perceptron class trained with back propagation algorithm has been used in this work. The effect of a number of issues in relation to ANN construction such as ANN geometry and internal parameters on the performance of ANN models is investigated. Information on the relative importance of the factors affecting the (n), is presented, and practical equations for its prediction are proposed.