

عنوان مقاله:

ANFIS-TLBO HYBRID APPROACH TO PREDICT COMPRESSIVE STRENGTH OF RECTANGULAR FRP COLUMNS

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خلاصه مقاله:

Today, due to the complexity of engineering problems and at the same time the advancement of computer science, the use of machine learning (ML) methods and soft computing methods in solving engineering problems has been considered by many researchers. These methods can be used to find accurate estimates for problems in various scientific fields. This paper investigates the effectiveness of the Adaptive Network-Based Fuzzy Inference System (ANFIS) hybridized with Teaching Learning Based Optimization Algorithm (TLBO), to predict the ultimate strength of columns with square and rectangular cross-sections, confide with various fiber-reinforced polymer (FRP) sheets. In previous studies by many researchers, several experiments have been conducted on concrete columns confined by FRP sheets. The results indicate that FRP sheets effectively increase the compressive strength of concrete columns. Comparing the results of ANFIS-TLBO with the experimental findings, which were agreeably consistent, demonstrated the ability of ANFIS-TLBO to estimate the compressive strength of concrete confined by FRP. Also, the comparison of RMSE, SD, and R^2 for ANFIS-TLBO and the studies of different researchers show that the ANFIS-TLBO approach has a good performance in estimating compressive strength. For example, the value of R^2 in the proposed method was 0.92, while this parameter was 0.87 at best among the previous studies. Also, the obtained error in the prediction of the proposed model is much lower than the obtained error in the previous studies. Hence, the proposed model is more efficient and works better than other techniques.

کلمات کلیدی:

.ANFIS, Teaching Learning Based Optimization, FRP, compressive strength

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