

عنوان مقاله:

Structural performance prediction of GFRP elastic gridshell structures by artificial neural network

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خلاصه مقاله:

GFRP elastic gridshell structure is a kind of structure made of GFRP elements that is constructed by deforming an initially flat grid. Deformation prediction is critical for designing of elastic gridshells, because deformation can often lead to breakages in the structure. This paper presents displacement predictor by utilizing an artificial neural network (ANN) on the dataset prepared by the generated shapes of the gridshell and obtained maximum displacement of each shape by finite element (FE) analysis. The ANN model consists of eight input factors, five layers, and one output factor. Design variables are three parameters of width, one parameter of length, three parameters of height and grid size as input and the ratio of maximum displacement to self-weight as output. A variety of samples are generated and then analyzed by the FE model to be used for training, validating, and testing the ANN algorithm. The results show that the proposed method predicts the maximum displacement of the GFRP elastic gridshell with high accuracy.

کلمات کلیدی:

artificial neural network, machine learning, structural analysis, elastic gridshells, finite element

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