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Prediction of Displacement and Stress of Stiffened Plate using Neural Network

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Summary: At the design stage of the large-scale steel structure, displacement and stress are generally analyzed by using the FEM. At the initial design stage, it is required for evaluating conditions of numerous design candidates. Therefore, it is not efficient to use FEM with fine mesh for analyzing the strength of structures in spite of requiring accuracy in the evaluation. In this paper, Neural Network System is developed for predicting displacement and stress based on a coarse mesh with the same accuracy of fine mesh. It is able to predict accurate displacement and stress at stiffened plate using FEM analytical results with coarse mesh as input factors for Neural Network System. In order to improve the approximation accuracy of Neural Network System, Multiple linear regression method is introduced for selecting input factors for a Neural Network System. This technique improves the accuracy of Neural Network System and reduce manpower used for structure design. The proposed Neural Network System is able to predict displacement and stress in spite of changing the load, plate thickness, and the number of stiffeners.

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