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# STRUCTURAL OPTIMIZATION OF A STIFFENED CYLINDER USING ARTIFICIAL NEURAL NETWORKS

**Abstract**

Artificial neural networks (ANN) are being widely used to train the systems on existing datasets in order to use them for solving unseen similar problems. In structural engineering, the use of such innovative technologies has revolutionized the design and optimization processes and brought about a paradigm shift in the approach of engineers. Presently, a stiffened cylinder is optimized for mass index against required buckling behavior using the approach of neural networks juxtaposed with genetic algorithm. The data set is generated using finite element iterations for training the network of neurons to gauge the nonlinear behavior of the inputs to outputs. This study parameterized the systems for two outputs (mass, eigen value) against seven geometric input parameters. Relevant weights and biases are generated and the program code mapping the whole procedure is created. Genetic algorithm is then used to optimize the response of the desired outputs against the variation of parameters using the developed network. The results are then validated against a 3D model created with the optimized response and produces above 90% accuracy with the desired eigen value, concomitantly furnishing a 12% mass decrease from the initial model.