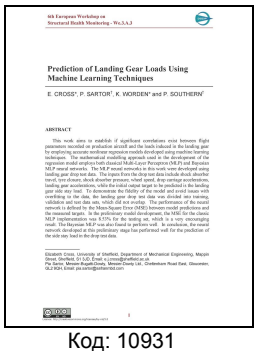

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Prediction of Landing Gear Loads Using Machine Learning Techniques

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This work aims to establish if significant correlations exist between flight parameters recorded on production aircraft and the loads induced in the landing gear by employing accurate nonlinear regression models developed using machine learning techniques. The mathematical modelling approach used in the development of the regression model employs both classical Multi-Layer Perceptron (MLP) and Bayesian MLP neural networks. The MLP neural networks in this work were developed using landing gear drop test data. The inputs from the drop test data include shock absorber travel, tyre closure, shock absorber pressure, wheel speed, drop carriage accelerations, landing gear accelerations, while the initial output target to be predicted is the landing gear side stay load. To demonstrate the fidelity of the model and avoid issues with overfitting to the data, the landing gear drop test data was divided into training, validation and test data sets, which did not overlap. The performance of the neural network is defined by the Mean-Square Error (MSE) between model predictions and the measured targets. In the preliminary model development, the MSE for the classic MLP implementation was 8.53% for the testing set, which is a very encouraging result. The Bayesian MLP was also found to perform well. In conclusion, the neural network developed at this preliminary stage has performed well for the prediction of the side stay load in the drop test data.

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Ключевые слова:

Содержание