The Learning-based Approach to Forecasting the Flight Load Factor

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Abstract

To effectively forecast the flight load factor is pivotal in the aviation industry. This study proposes the cramming, softening and integrating (CSI) algorithm, a sequentially-learning-based algorithm, to forecast the flight load factor. The proposed CSI learning algorithm has the following features: (1) the implementation of new data-driven algorithm using adaptive single-hidden layer feed-forward neural networks, (2) the usage of least trimmed squares principle to speed up the training time, (3) the practice of cramming mechanism to precisely learning all training data, and (4) the implementations of the regularization term and the softening and integrating mechanism to alleviate the obtained model from the overfitting pain. An experiment with real data from one of Taiwan aviation companies has been conducted to explore whether the proposed CSI learning algorithm can (1) predict the flight load factor better than other methods in the current literature, the Littlewood's rule, (2) perfectly learn thorough training data, as it claims, and (3) alleviate the overfitting pain through the regularization term and the softening and integrating mechanism. The experimental results are promising.

Keywords: CSI learning, cramming mechanism, softening and integrating mechanism, least trimmed squares, flight load factor