

Development of an Efficient Algorithm for Cessna Citation X Speed Optimization in Cruise

Authors : Georges Ghazi, Marc-Henry Devillers, Ruxandra M. Botez

Abstract : Aircraft flight trajectory optimization has been identified to be a promising solution for reducing both airline costs and the aviation net carbon footprint. Nowadays, this role has been mainly attributed to the flight management system. This system is an onboard multi-purpose computer responsible for providing the crew members with the optimized flight plan from a destination to the next. To accomplish this function, the flight management system uses a variety of look-up tables to compute the optimal speed and altitude for each flight regime instantly. Because the cruise is the longest segment of a typical flight, the proposed algorithm is focused on minimizing fuel consumption for this flight phase. In this paper, a complete methodology to estimate the aircraft performance and subsequently compute the optimal speed in cruise is presented. Results showed that the obtained performance database was accurate enough to predict the flight costs associated with the cruise phase.

Keywords : Cessna Citation X, cruise speed optimization, flight cost, cost index, and golden section search

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