

Sensitivity Factors of Aircraft Mass for the Conceptual Design

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Abstract. Take-off gross mass (TOGM) of the aircraft is one of the important parameters in the design process. This paper considers the problem of rapid assessment of changes in the TOGM of the selected and already developed a basic version of the aircraft project when making local changes to improve it or for the numerical researches to synthesize a more advanced project. Either the minimum value of TOGM or fuel efficiency is used as a criterion. This method is based on the "Sensitivity factors of mass" (SFM) of aircraft, which represents the ratio of TOGM to initial (local) mass changes. The method of analytical refined calculation of SFM for the initial mass change and for the main aerodynamic characteristics is given. The dependence of SFM on the value of the initial mass change is shown. Numerical calculations are given on the example of passenger aircraft.

Keywords: Conceptual design, aircraft mass, sensitivity factors of mass, numerical researches of basic project