AIRCRAFT FUEL MASS ESTIMATION USING GLOBAL NONLINEAR PARAMETRIC MODELING

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Abstract

The accuracy of fuel measurement in aircraft tanks is directly related to flight safety and maneuverability. Capacitance gauging is widely used and is the industry accepted method for accurate measurement of the fuel quantity. In this paper, a global nonlinear parametric modeling technique is applied to estimate the fuel content using the capacitance probe data generated from 3-dimensional models of the aircraft fuel tanks. Automatic Net generation Tool for Structural Analysis (ANSA) software is used to create the fuel tank solid models. Using truth tables generated from ANSA software, several 3rd order polynomial models are developed. The fuel estimation algorithm is implemented in real time using Microcontroller based electronic unit.

Keywords: Fuel quantity, Fuel gauging probe, Automatic Net generation Tool for Structural Analysis (ANSA), Microcontroller, Time Processor Unit (TPU) channel

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