

SELECTED TOPICS In Aerospace Engineering

EDITOR

ERWIN SULAEMAN



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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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APPROXIMATE FUNCTION FOR NEAR-FIELD KERNEL FUNCTION OF NON-PLANAR LIFTING SURFACES

24.1. Introduction

In the present work, a new approximate function for evaluating the near field kernel function for nonplanar multiple interfering lifting surface configurations oscillating in unsteady subsonic flow is described. A simple curve fitting technique has been utilized to approximate the denominator of the integrand of the incomplete cylindrical function occurring in the kernel function of unsteady lifting surface aerodynamic. The maximum error within the range of the predefined is less than 0.0015. The approximate function is simple enough such that it can be used to compute the unsteady aerodynamic analysis of non-planar lifting surfaces oscillating in subsonic flows.

24.2. Kernel Function Equation

Investigations are in progress for the improvement of accuracy and efficiency of the prediction methods for more complicated aerodynamic configurations from two dimensional thin airfoils to full scale aircrafts. The solution of pressure – normal wash formulation which exhibits a highly complicated kernel function, with improved accuracy and efficiency is the subject of the research. The most widely accepted unsteady aerodynamic load formulation in subsonic and supersonic flows is the aerodynamic pressure –velocity formulation (Kussner, 1941). Since its derivation this has been mostly used formulation. Subsequently many efforts have been made to