

A RECONSTRUCTIVE APPROACH FOR DESIGN OF A PLANAR SUPERCRITICAL WING

S.C. Gupta
Professor and Head
Department of Aeronautical and Aerospace Engineering
MVJ College of Engineering
Channasandra, Kadugodi Post, Near ITPL
Bangalore-560 067, India
Email : satish_chander_gupta@yahoo.co.in

Abstract

Effort is made to design an efficient planar wing that can support transonic pressure distribution. Wing for transport airplane role is considered. First optimal warp is generated for minimum induced drag for a Mach number that is just below transonic Mach number. Optimal warp thus generated is split into twist and camber. The resulting camber is used to form a planar wing. The camber of this aerofoil is varied along span. Twist is no more considered. Aerofoil thickness is superimposed on this camber. Mach number is increased till supercritical flow appears. The whole process is reconstructive in approach. Results obtained are very encouraging and are application oriented. Pattern of supercritical pressure distribution is studied from point of view of suction peaks, shock wave location, and aft loading intensity occurring towards trailing edge. Main effort of our exercise is to create shock free transonic wing.