

Problem 340F

An infinitely thin, flat plate airfoil (chord, c) set at a very small angle of attack, α , to an oncoming supersonic stream of Mach number, $M = 1.5$, is operating close to the ground. If the distance from the leading edge to the ground is denoted by h , find:

(a) the ratio, h/c , for which the lift on the airfoil will be affected by the presence of the ground and beyond which the lift will be unaffected.

(b) the ratio of the lift coefficient when $h/c = 0.2$ to the lift coefficient in the absence of any ground effect.

Use supersonic theory for small angles of turn.