

Study of Three-Dimensional Separation of Boundary Layer over Blunt Bodies

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Abstract

In the case of three-dimensional flows, the separation can be defined in more than one way. Discussions about three-dimensional boundary layer separation in the literature have found a rational extension of the zero skin friction. Attempts have been made to establish the identity of "separation lines". Among definitions, these may be found: (1) envelopes of limiting streamlines, (2) lines dividing flow which has come from different regions, (3) lines of singularities (problems of topology), (4) lines on which some component of the skin friction vanishes. Each of these is valid under certain conditions, but none is universally valid.

In the present work, we use the definition (4), i.e. at low incidence of a blunt body the separation line is identified as the zero of the meridian skin friction component (Wang 1975). So the separation line on a flattened spheroid (6:3:1) at 6° of incidence is calculated, as well as experimentally determined by using the electrochemical method, which allows to follow the evolution of the parietal velocity gradient.

Keywords: three-dimensional flows; separation; boundary layers; blunt bodies.

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