Effect of the angle of attack on the wind convection coefficient

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Abstract

In this study the effect of the positive angle of attack (angle between flat plate surface and incoming uniform flow) on the convective heat transfer coefficient was investigated numerically. In the case of inviscid flow, this effect was also presented analytically and was found to be in good agreement with the corresponding numerical results. From the obtained numerical data, an accurate correlation equation of Nusselt number was proposed by introducing the effect of the angle of attack in terms of a new factor Af. The variation of the convective heat transfer coefficient as a function of the angle of attack was found not behaves in the same manner for both small and large values of Prandtl number at small angles of attack.

Keywords: Wind convection coefficient; Boundary layer equation; Forced convection over a flat plate; Nusselt number; Angle of attack; Correlation equation.

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