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Analysis of Görtler Vortices Spanwise Wavelenght Influence in Heat Transfer Rates LEANDRO F. SOUZA, VINICIUS MALATESTA, University of Sao Paulo, JOSEPH T.C. LIU, Brown University — The centrifugal instability mechanism in boundary layers flows over concave surfaces is responsible for the development of streamwise counter-rotating vortices, known as Görtler vortices. These Vortices create two regions in the spanwise direction, the upwash and downwash regions. The downwash region is responsible to compress the boundary layer towards the wall, increasing drag and heat transfer rates. The upwash region does the opposite. In the nonlinear development of the Görtler vortices the upwash region becomes narrow, and the average drag and heat transfer rate is higher than that for a Blasius boundary layer. In the present research, using a Spatial Direct Numerical Simulation, it is analyzed the influence of the Görtler Vortices spanwise wavelength in heat transfer rates. Different wavelengths are analyzed and compared with experiments.[1] The results show that steady Görtler flow can reach heat transfer rates higher than the turbulent values, even without introducing secondary instabilities.

[1]L. Momayez, P. Dupont and H. Peerhossaini, Int J Therm Sci, 43, 753–760 (2004)

Joseph T.C. Liu
Brown University

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