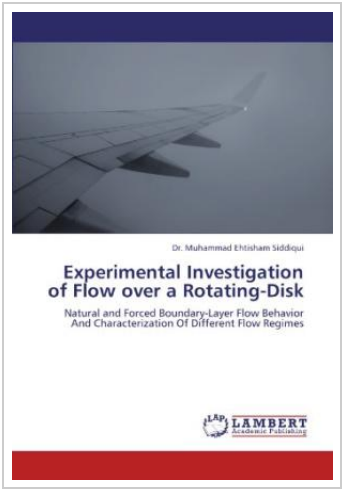

Experimental Investigation of Flow over a Rotating-Disk

By Siddiqui, Muhammad Ehtisham

Condition: New. Publisher/Verlag: LAP Lambert Academic Publishing | Natural and Forced Boundary-Layer Flow Behavior And Characterization Of Different Flow Regimes | This book is based on the experimental study of the rotating-disk boundary-layer flow. In the case of the natural flow, different flow regimes are identified as a function of nondimensional distance, R, from the disk axis. Mean-velocity profiles initially follow the von Kármán solution. At higher R, departures arise and increase with R, which are due to the spatial growth of boundary-layer instability modes, whose radial growth rates are found to match linear-theory predictions. The profiles in the fully turbulent region follow the turbulent log law and the velocity spectra exhibit Kolmogorov-type power laws. To study the response to forcing, a setup has been designed which allows the excitation of stationary (in the lab frame) disturbances or disturbances which rotate with a frequency independently of the disk frequency. The flow response to both types of forcing and two forcing element geometries was studied. Stationary forcing produces a wake which decays with distance from the element, in agreement with theory. Forcing due to rotating elements can generate growing wavepacket-like disturbances, which although nonlinear, follow trajectories close to linear-theory predictions. |...

Reviews

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