



A Three-Dimensional Unsteady Cfd Model of Compressor Stability (Paperback)

By Rodrick V Chima

Bibliogov, United States, 2013. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****.A three-dimensional unsteady CFD code called CSTALL has been developed and used to investigate compressor stability. The code solved the Euler equations through the entire annulus and all blade rows. Blade row turning, losses, and deviation were modeled using body force terms which required input data at stations between blade rows. The input data was calculated using a separate Navier-Stokes turbomachinery analysis code run at one operating point near stall, and was scaled to other operating points using overall characteristic maps. No information about the stalled characteristic was used. CSTALL was run in a 2-D throughflow mode for very fast calculations of operating maps and estimation of stall points. Calculated pressure ratio characteristics for NASA stage 35 agreed well with experimental data, and results with inlet radial distortion showed the expected loss of range. CSTALL was also run in a 3-D mode to investigate inlet circumferential distortion. Calculated operating maps for stage 35 with 120 degree distortion screens showed a loss in range and pressure rise. Unsteady calculations showed rotating stall with two part-span stall cells. The paper describes the body force formulation...



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