Turbomachines Notes

A general vector differential equation for the vorticity component parallel to a streamline is derived for steady, nonviscous and incompressible flow in a rotating system. This equation is then simplified by restricting it to rotating radial channels and by making further simplifying assumptions. This simplified equation is used to solve for the secondary vorticity, the vorticity component parallel to the streamline, in three special cases involving different streamtube geometries; the results are presented in a series of figures. The secondary vorticity is show to decrease with decreased absolute angular velocity of the fluid, decreased inlet total-pressure gradient, decreased length of relative flow path, and increased velocity.

Technical Note - National Advisory Committee for AeronauticsVibration Control EngineeringPassive and Feedback SystemsCRC Press

Twenty-one years have passed since the first symposium in this series was held in Paris (1976). Since then there have been meetings in Lausanne (1980), Cambridge (1984), Aachen (1987), Beijing (1989), Notre Dame (1991) and Fukuoka (1994). During this period a tremendous development in the field of unsteady aerodynamics and aeroelasticity in turbomachines has taken place. As steady-state flow conditions become better known, and as blades in the turbomachine are constantly pushed towards lower weight, and higher load and efficiency, the importance of unsteady phenomena appear more clearly. th The 8 Symposium was, as the previous ones, of high quality. Furthermore, it presented the audience with the latest developments in experimental, numerical and theoretical research. More papers than ever before were submitted to the conference. As the organising committee wanted to preserve the uniqueness of the symposium by having single sessions, and thus mingle speakers and audience with different backgrounds in this interdisciplinary field, only a limited number of papers could be accepted. 54 papers were accepted and presented at the meeting, all of which are included in the present proceedings.

Der Band führt in Grundlagen, Auslegung und rechnergestützte Simulation stationärer und mobiler Gasturbinenanlagen ein. Ausgehend von den realen, thermodynamischen Arbeitsprozessen werden die Hauptkomponenten wie Turboverdichter, Turbinen und Brennräume dargestellt. Darauf aufbauend wird das stationäre und instationäre Betriebsverhalten simuliert sowie die Anpassung an verschiedene Lastbereiche und Einsatzbedingungen behandelt. Strategien zur Auslegungsmethodik und -optimierung werden insbesondere an typischen Turbofan-Triebwerken demonstriert.

This book applies vibration engineering to turbomachinery, covering installation, maintenance and operation. With a practical approach based on clear theoretical principles and formulas, the book is an essential how-to guide for all professional engineers dealing with vibration issues within turbomachinery. Vibration problems in turbines, large fans, blowers, and other rotating machines are common issues

within turbomachinery. Applicable to industries such as oil and gas mining, cement, pharmaceutical and naval engineering, the ability to predict vibration based on frequency spectrum patterns is essential for many professional engineers. In this book, the theory behind vibration is clearly detailed, providing an easy to follow methodology through which to calculate vibration propagation. Describing lateral and torsional vibration and how this impacts turbine shaft integrity, the book uses mechanics of materials theory and formulas alongside the matrix method to provide clear solutions to vibration problems. Additionally, it describes how to carry out a risk assessment of vibration fatigue. Other topics covered include vibration control techniques, the design of passive and active absorbers and rigid, non-rigid and Z foundations. The book will be of interest to professionals working with turbomachinery, naval engineering corps and those working on ISO standards 10816 and 13374. It will also aid mechanical engineering students working on vibration and machine design.

The program will determine the velocities in the meridional plane of a backward-swept impeller, a radial impeller, and a vaned diffuser. The velocity gradient equation with the assumption of a hub-to-shroud mean stream surface is solved along arbitrary quasi-orthogonals in the meridional plane. These quasi-orthogonals are fixed straight lines.

Includes the Committee's Reports no. 1-1058, reprinted in v. 1-37.

Primarily designed as a text for the undergraduate students of aeronautical engineering, mechanical engineering, civil engineering, chemical engineering and other branches of applied science, this book provides a basic platform in fluid mechanics and turbomachines. The book begins with a description of the fundamental concepts of fluid mechanics such as fluid properties, its static and dynamic pressures, buoyancy and floatation, and flow through pipes, orifices, mouthpieces, notches and weirs. Then, it introduces more complex topics like laminar flow and its application, turbulent flow, compressible flow, dimensional analysis and model investigations. Finally, the text elaborates on impact of jets and turbomachines like turbines, pumps and miscellaneous fluid machines. KEY FEATURES : Comprises twenty four methods of flow measurements. Presents derivations of equations in an easy-to-understand manner. Contains numerous solved numerical problems in S.I. units. Includes unsteady equations of continuity and dynamic equation of gradually varied flow in open channel.

Volume X of the High Speed Aerodynamics and Jet Propulsion series. Contents include: Theory of Two-Dimensional Flow through Cascades; Three-Dimensional Flow in Turbomachines; Experimental Techniques; Flow in Cascades; The Axial Compressor Stage; The Supersonic Compressor; Aerodynamic Design of Axial Flow Turbines; The Radial Turbine; The Centrifugal Compressor; Intermittent Flow Effects. Originally published in 1964. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.

Mass-flow tables for ratios of specific heats of 1.3 and 1.4 are presented for the entire range of critical velocity ratio. The tables enable a quick and accurate determination of the integrated average specific mass flow across a region where the end-point velocities are known, commensurate with the assumptions that the total state is constant and the static pressure varies linearly between the two velocities. A numerical example is included to illustrate the use of the tables. All quantities are in nondimensional form and are tabulated sgainst critical velocity ratio. The tables include specific-mass-flow parameter and ratio of static to total pressure.

The textbook examines the fundamentals of turbomachine theory and also the configurations and operating principles of turbomachines of various types - axial, centrifugal, and mixed-flow compressors and axial turbines. Considerable attention is devoted to turbine and compressor performance and regulation and also the problems of matching their parameters in the gas turbine engine system. The text is intended for students of aviation colleges and schools. It may also be used by engineering and technical personnel working in aircraft engine construction. (Author).