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Ginevsky - Zhelannikov

Vortex wakes of Aircrafts

Vortex Wakes Of Aircrafts Foundations Of Engineering Mechanics

JR Anderson



Vortex Wakes Of Aircrafts Foundations Of Engineering Mechanics:

Vortex wakes of Aircrafts A.S. Ginevsky, A. I. Zhelannikov, 2009-07-07 Investigation of vortex wakes behind various aircraft especially behind wide bodied and heavy cargo ones is of both scientific and practical interest. The vortex wakes shed from the wing's trailing edge are long lived and attenuate only at distances of 10-12 km behind the wake generating aircraft. The encounter of other aircraft with the vortex wake of a heavy aircraft is open to catastrophic hazards. For example, air refueling is a dangerous operation partly due to the possibility of the receiver aircraft's encountering the trailing wake of the tanker aircraft. It is very important to know the behavior of vortex wakes of aircraft during their takeoff and landing operations when the wakes can propagate over the airport's ground surface and be a serious hazard to other departing or arriving aircraft. This knowledge can help in enhancing safety of aircraft's movements in the terminal areas of congested airports where the threat of vortex encounters limits passenger throughput. Theoretical investigations of aircraft vortex wakes are being intensively performed in the major aviation nations. Used for this purpose are various methods for mathematical modeling of turbulent flows: direct numerical simulation based on the Navier-Stokes equations, large eddy simulation using the Navier-Stokes equations in combination with subgrid scale modeling, simulation based on the Reynolds equations closed with a differential turbulence model. These approaches are widely used in works of Russian and other countries' scientists. It should be emphasized that the experiments in wind tunnels and studies of natural vortex wakes behind heavy and light aircraft in flight experiments are equally important.

Flight Performance of Fixed and Rotary Wing Aircraft Antonio Filippone, 2006-05-10 Calculation and optimisation of flight performance is required to design or select new aircraft, efficiently operate existing aircraft and upgrade aircraft. It provides critical data for aircraft certification, accident investigation, fleet management, flight regulations and safety. This book presents an unrivalled range of advanced flight performance models for both transport and military aircraft, including the unconventional ends of the envelopes. Topics covered include the numerical solution of supersonic acceleration, transient roll, optimal climb of propeller aircraft, propeller performance, long range flight with en route stop, fuel planning, zero gravity flight in the atmosphere, VSTOL operations, ski jump from aircraft carrier, optimal flight paths at subsonic and supersonic speed, range, payload analysis of fixed and rotary wing aircraft, performance of tandem helicopters, lower bound noise estimation, sonic boom and more. This book will be a valuable text for undergraduate and post graduate level students of aerospace engineering. It will also be an essential reference and resource for practicing aircraft engineers, aircraft operations managers and organizations handling air traffic control, flight and flying regulations, standards, safety, environment and the complex financial aspects of flying aircraft. Unique coverage of fixed and rotary wing aircraft in a unified manner, including optimisation, emissions control and regulation. Ideal for students, aeronautical engineering capstone projects and for widespread professional reference in the aerospace industry. Comprehensive coverage of computer based solution of aerospace engineering problems, the critical analysis of performance

data and case studies from real world engineering experience Supported by end of chapter exercises Flow Phenomena in Nature: A challenge to engineering design Roland Liebe,2007 Do we have an adequate understanding of fluid dynamics phenomena in nature and evolution and what physical models do we need What can we learn from nature to stimulate innovations in thinking as well as in engineering applications Concentrating on flight and propulsion this unique and accessible book compares fluid dynamics solutions in nature with those in engineering The respected international contributors present up to date research in an easy to understand manner giving common viewpoints from fields such as zoology engineering biology fluid mechanics and physics Contents Introduction to Fluid Dynamics Swimming and Flying in Nature Generation of Forces in Fluids Current Understanding The Finite Natural Vortex in Steady and Unsteady Fluid Dynamics New Modelling Applications in Engineering with Inspirations From Nature Modern Experimental and Numerical Methods in Fluid Dynamics **Aeronautical Engineering** ,1993 A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in Scientific and technical aerospace reports STAR and International aerospace abstracts IAA **AIAA Journal** American Institute of Aeronautics and Astronautics,2001 **International Aerospace Abstracts** ,1999 **A Collection of Technical Papers** ,1978 *Journal of Engineering Mechanics* ,2003 **Transactions of the American Society of Civil Engineers** American Society of Civil Engineers,1974 Vols 29 30 contain papers of the International Engineering Congress Chicago 1893 v 54 pts A F papers of the International Engineering Congress St Louis 1904 **The American Naturalist** ,1978 Paper ,1969 Aeronautical Engineering: 1983 Cumulative Index ,1984 **Journal of Applied Mechanics** ,1969 Publishes original research in all branches of mechanics including aerodynamics aeroelasticity boundary layers computational mechanics constitutive modeling of materials dynamics elasticity flow and fracture heat transfer hydraulics impact internal flow mechanical properties of materials micromechanics plasticity stress analysis structures thermodynamics turbulence vibration and wave propagation **Directory of Research Grants** ,1994 *The Aeronautical Journal* ,1992 Government Reports Announcements ,1975-07-11 *Government Reports Announcements & Index* ,1975 **Applied Mechanics Reviews** ,1992 Physics Briefs ,1993 AIAA Bulletin ,1974

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