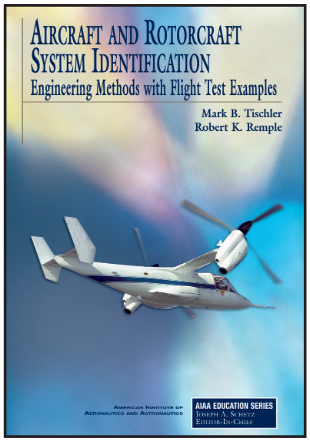

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Aircraft and Rotorcraft System Identification

Engineering Methods with Flight Test Examples

ABOUT THE AUTHORS

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ABOUT THE BOOK

Although many books have been written on the theory of system identification, few are available that provide a complete engineering treatment of system identification and how to successfully apply it to flight vehicles. This book provides the unique perspective of over 20 years of flight-test applications to both aircraft and rotorcraft and is a valuable resource for students, working engineers, and others interested in atmospheric flight mechanics, modeling and simulation, and test and evaluation. It presents proven methods, practical guidelines, and real-world flight-test results for a wide range of state-of-the-art flight vehicles, from small uncrewed aerial vehicles (UAVs) to large manned aircraft/rotorcraft.

Beginning with the basic concepts of system identification, each chapter traces a simple simulation example and real flight examples through the step-by-step process from instrumentation and data checking to model extraction and model verification. The frequency-response method, which is unique to this book, is especially well suited for system identification of aircraft and rotorcraft dynamics models from flight-test data. A complete chapter is devoted to higher order modeling of helicopters. Many applications are included to demonstrate how the products resulting from system identification are used. Specific applications include flight mechanics and handling-qualities analyses, stability margin determination, structural mode determination, and simulation model fidelity assessment.

The book assumes knowledge of the basic concepts of aeronautics, Laplace transforms, and flight dynamics and classical control. Emphasis is placed on engineering methods and interpretation of flight-test results, and each key method or analysis application is illustrated with graphics obtained from the system identification software (CIFER®) provided with the book. Case studies based on real flight-test projects are included as well as problems for students to solve using the provided CIFER® software.

CONTENTS

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