

Preface

This book presents a survey of modern methods for dynamic modelling of gas turbine engines. The manuscript was prepared using the results of research and unique practical experience of digital controller design for aero gas turbine engines. Experience of different research teams from Russia and the United Kingdom in the field of modelling of aero engines is summarised.

Dynamic models are traditionally used for describing behaviour of various systems. Dynamic models allow the design, analysis and identification of systems. Moreover, dynamic models can also be used for condition monitoring of complex systems providing information redundancy. The book describes various approaches to building and applying dynamic models. The approaches are compared and results of experiments on real engines are supplied.

The research team of Prof. G. Kulikov from Ufa State Aviation Technical University (Department of Automated Control and Management Systems) has a long history of participation in aero engine control design projects with Russian and Ukrainian industry. Chapters 1-4, 7, 10-13, 15 were contributed by Prof. G. Kulikov, Prof. V. Arkov and Dr. T. Breikin. Chapter 14 was contributed by Dr. O. Lyantsev.

The research team of Prof. P. Fleming works in close collaboration with British industry in the framework of the Rolls-Royce University Technology Centre for Control and Systems Engineering (Automatic Control and Systems Engineering Department, the University of Sheffield, UK). The introduction was contributed by Prof. P. Fleming and Prof. H. Thompson. Chapter 9 was contributed by Prof. P. Fleming, Prof. H. Thompson and Dr. K. Rodriguez-Vazquez.

The team of Dr. D. Rees (University of Glamorgan, UK) participates in research projects investigating modelling of Rolls-Royce aero engines. Chapters 5, 6 and 8 were contributed by Dr. D. Rees and Dr. N. Chiras.

Recently, a joint research programme was performed by all the mentioned teams funded by the British government enabling extended experimentation to be carried out at the Rolls-Royce test facility at DERA. Various identification techniques were demonstrated and compared during this project, and results are also featured in the book.

The monograph should be useful for control engineers, scientists and students.

Ufa, Russian Federation, August 2003

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