

Preface

This volume continues the tradition of publishing the contributions submitted to and presented at international symposia on unsteady aerodynamics, aeroacoustics, and aeroelasticity in turbomachines (ISUAAAT).

The first symposium in the series was organized by Prof. R. Legendre in Paris in September 1976, i.e., 30 years ago. Subsequent symposia were held in Losanne, Switzerland (1980), Cambridge, England (1984), Aachen, Germany (1987), Beijing, People's Republic of China (1989), Notre Dame, USA (1991), Fukuoka, Japan (1994), Stockholm, Sweden (1997), Lion, France (2000), and Dorem, USA (2003). As is seen, the tradition of the ISUAAAT meetings every three years is settled. The ISUAAAT-2006, which formed the basis for this volume, was held in Moscow, Russia, September 4–8, 2006, and organized by P. I. Baranov Central Institute of Aviation Motors.

The periodic organization of the symposia indicates the persistent interest to its topical scope. Despite the issues addressing unsteady flow phenomena and aeroelasticity are discussed at many other conferences related to turbomachinery, the ISUAAAT meetings sustain their significance for the community. On the one hand, this is explained primarily by growing requirements to advanced turbomachines in terms of durability, efficiency, and noise. On the other hand, the variety and complexity of unsteady phenomena in turbomachines pose a number of questions related to fundamental hydro- and aerodynamics. The latter is caused, first of all, by high frequencies of relevant processes and by interaction of neighboring stator and rotor bladerows. It is commonly understood that one of the most complicated issues to be resolved at the design stage is the account for aeroelastic vibrations of blades in the flow paths of turbomachines. The main specific feature of ISUAAAT meetings is that they are focused on the discussion of multiple issues relevant to unsteady phenomena in turbomachines.

The book includes 34 articles, which are grouped in six chapters according to the ISUAAAT-2006 topics. When composing the chapters, the editors intended to select the articles fitting a proper topic in

the general scope. In particular, the first two chapters deal with aeroelasticity although blade vibrations in the flow are considered solely in Chapter 1. This chapter contains contributions on flutter and some novel computational approaches related to it. Chapter 2 combines the articles dedicated to unsteady aerodynamic loading of blades oscillating in the preset modes with predefined frequencies. The articles considering various aspects of rotor–stator interaction are included in Chapter 3. Chapter 4 contains the articles aimed at studies of various sources and propagation modes of acoustic disturbances in the turbomachine passages. The papers on computational methods for unsteady flows in turbomachines are grouped in Chapter 5, and Chapter 6 deals with physical effects accompanying unsteady flows. In general, the contents of the book reflect the state-of-the-art in the theoretical and experimental studies of unsteady flows in turbomachines. This can be useful for evaluating the predicting capability of computer codes proposed for practical calculations.

The volume was published before the opening of the ISUAAAT-2006. We thank all authors for preparing their papers and spending their time and efforts with the editors on improving the text, figures, and scope of their contributions to fit with the overall goals of the book. On our profound belief, these efforts are justified by timely publishing of the Symposium proceeding.

On behalf of the ISUAAAT-2006 Organizing Committee, we thank the members of the International Scientific Committee of ISUAAAT, H.M. Atassi (USA), T.P. Crisval (France), P. Ferrand (France), T.H. Fransson (Sweden), K.C. Hall (USA), M. Imregun (U.K.), R.E. Kielb (USA), M. Namba (Japan), T. Nagashima (Japan), J.M. Verdon (USA), and D.S. Whitehead (U.K.), for their decision to have the Symposium-2006 in Moscow and for continuous support during Symposium preparations.

We would like to call late Professor G. Yu. Stepanov (1922–2005) to our memory, who rendered assistance to the Organizing Committee at the very beginning of Symposium preparations. Professor G. Yu. Stepanov was a participant of the First ISUAAAT Symposium and edited Russian translation of the Symposium Proceedings*.

*Stepanov, G. Yu., ed. 1979. *Unsteady flows in turbomachines*. Moscow: Mir Publ.

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This volume is the outcome of hard work of several persons, and we highly appreciate their valuable contribution. In particular, we acknowledge the assistance given at various stages by Ms. Olga Frolova. We thank the staff of TORUS PRESS Publishers for their excellent service in producing this volume. We do hope that this volume will serve as a useful addition to the literature on unsteady phenomena in turbomachines.

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