# CAMBRIDGE SCIENTIFIC PUBLISHERS

## AN INTERNATIONAL BOOK SERIES
## STABILITY OSCILLATIONS AND OPTIMIZATION OF SYSTEMS

**Stability of Motions: The Role of Multicomponent Liapunov's Functions**
*Stability, Oscillations and Optimization of Systems: Volume 1*
*322 pp, 2007   ISBN 978-1-904868-45-3 £55/$100/€80*

**A.A. Martynyuk,**
*Institute of Mechanics, National Academy of Sciences of Ukraine, Kyiv, Ukraine*

This volume presents stability theory for ordinary differential equations, discrete systems and systems on time scale, functional differential equations and uncertain systems via multicomponent Liapunov's functions. The book sets out a new approach to solution of the problem of constructing Liapunov's functions for three classes of systems of equations. This approach is based on the application of matrix-valued function as an appropriate tool for scalar or vector Liapunov function. The volume proposes an efficient solution to the problem of robust stability of linear systems. In terms of hierarchical Liapunov function the dynamics of neural discrete-time systems is studied and includes the case of perturbed equilibrium state.

Written by a leading expert in stability theory the book
- explains methods of multicomponent Liapunov functions for some clases of differential equations
- introduces new results of polystability analysis, multicomponent mapping and polydynamics on time scales
- includes many important new results some previously unpublished
- includes many applications from diverse fields, including of motion of a rigid body, discrete-time neural networks, interval stability, population growth models of Kolmogorov type

## CONTENTS
**Preface • Notations • Stability Analysis of Continuous Systems • Stability Analysis of Discrete-Time Systems • Stability in Functional Differential Systems • Stability Analysis of Impulsive Systems • Applications • Index**

The **Stability of Motions: The Role of Multicomponent Liapunov's Functions** fulfills the reference needs of pure and applied mathematicians, applied physicists, industrial engineers, operations researchers, and upper-level undergraduate and graduate students studying ordinary differential, difference, functional differential and impulsive equations.