

In this book, scalar, matrix and operator Riccati equations are considered. Theoretical questions and practical methods of solution of these equations are expounded. The necessary auxiliary facts from algebra, functional analysis and Lie group analysis are given. Theory is illustrated with solutions of numerous examples. The matrix Riccati equations are presented completely. Lie groups on matrices theory have been advanced for an analysis of these equations. Theoretical questions concerning matrix and operator equations are dealt with based on a variety of applied problems from mathematical physics, optimal control of finite dimensional systems and distributed parameters systems.

Alexander Ivanovich Egorov, born 1930, D. Sc. (Physics & Mathematics), Professor at the Moscow Institute of Physics and Technology, leading researcher at the Program Systems Institute of the Russian Academy of Sciences. The author of more than 100 papers on the theory of optimal control, including several monographs, all in Russian: *Optimal control with heat and diffusion processes*, Moscow: Nauka, 1978; *Optimal control with linear systems*, Kiev, 1988; *Mathematical methods of the optimization of heat and diffusion processes* (co-authored with R. R. Rafatov), Frunze, 1990; *Riccati equations*, Moscow: Fizmatlit, 2001; *Foundations of control theory*, Moscow: Fizmatlit, 2004; *Ordinary differential equations with applications*, Moscow: Fizmatlit, 2005. The present monograph is a revised English translation of the 2001 Russian edition.

