

Approximate solutions of some classes of dynamic and control problems based on Pade approximations

Mikhail Dmitriev, Yulia Danik

Abstract: Different asymptotic approximations techniques for regularly and singularly perturbed problems are demonstrated on several classes of dynamic and control problems. We consider the initial value problem for a dynamic system of ordinary differential equations with fast and slow motions. We also study the problem of program and synthesizing control functions construction for continuous and discrete systems without constraints, where a small parameter in the system dynamics equations generates regular or singular perturbations. Special attention is paid to Pade approximations construction for the solutions of matrix Riccati equations. Both single-point and two-point Pade approximations are considered. Examples illustrating the algorithms are presented.

-
- ¹⁾ Mikhail Dmitriev, Professor: FRC CSC RAS, 119333, Moscow, Vavilova str., 44-2, Russia (RU), mdmitriev@mail.ru, the author presented this contribution at the conference in the special session: "Perturbative model order reduction in dynamics" organized by I.A. Andrianov and V.V. Danishevskyy.
- ²⁾ Yulia Danik, Ph.D.: FRC CSC RAS, 119333, Moscow, Vavilova str., 44-2, Russia (RU), yuliadanik@gmail.com.