

**A COMPLETE ASYMPTOTIC EXPANSION OF A SOLUTION TO
A SINGULAR PERTURBATION OPTIMAL**

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A. R. Danilin

We consider an optimal control problem for solutions of a boundary value problem on an interval for a second-order ordinary differential equation with a small parameter at the second derivative. The control is scalar and satisfies geometric constraints. Expansions of a solution to this problem up to any power of the small parameter are constructed and validated.

Keywords: optimal control, asymptotic expansion, singular perturbation problems, small parameter.

A.R. Danilin, Dr. Phys.-Math. Sci., Prof., Krasovskii Institute of Mathematics and Mechanics, Ural Branch of the Russian Academy of Sciences, Yekaterinburg, 620990 Russia; Ural Federal University, Yekaterinburg, 620002 Russia, e-mail: dar@imm.uran.ru .

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