TRUDY INSTITUTA MATEMATIKI I MEKHANIKI UrO RAN

Vol. 28 No. 2 **2022**

MSC: 34E20, 34E10

DOI: 10.21538/0134-4889-2022-28-2-193-200

AN INTERMEDIATE BOUNDARY LAYER IN SINGULARLY PERTURBED FIRST-ORDER EQUATIONS

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The Cauchy problem for a first-order ordinary differential equation with a small parameter at the derivative and a singular initial point is studied. A sufficient condition is found under which an intermediate boundary layer appears in a singularly perturbed problem described by first-order ordinary differential equations. A complete asymptotic expansion of the solution in the form of an asymptotic series in the sense of Erdélyi is constructed using a modified method of boundary functions. The obtained decomposition is justified; i.e. an estimate for the remainder term is obtained.

Keywords: boundary layer, intermediate boundary layer, Cauchy problem, singularly perturbed problem, bisingular problem, modified boundary function method, asymptotic solution.

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Received March 10, 2022
Revised March 28, 2022
Accepted April 4, 2022

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Cite this article as: D. A. Tursunov, G. A. Omaralieva. An intermediate boundary layer in singularly perturbed first-order equations. *Trudy Instituta Matematiki i Mekhaniki UrO RAN*, 2022, vol. 28, no. 2, pp. 193–200.