Method of the Structure Matching (MSM) of the Solution of the Singularly Perturbed Differential Equation

Key words: singularly perturbed equation, (outer and inner) asymptotical expansions of the solution, structure matching, method of Van Dike.

Singularly perturbed differential equation with small parameter before higher derivative or perturbed differential equation with singular point very often appear in fluid mechanics[1] and other sciences and techniques. Construction of the solution such equations meet large difficulty in connection with presence singular point. Asymptotic of the solution such equation will construct by method matching outer and inner solution which named method of Van Dike [1]. This method was justified by A.M.Ilin [2]. Here we will talk about new method MSM [3,4] and this method based on next principle: Coefficients of the asymptotic expansions outer and inner solution by while or fraction about small parameter have the same structure on the common domain where their existense simultaneously. Our method was applicate to model equation of Lighthill with singular regular point and generalization equation of Cole with singular point. MSM is simplification and generalization of the method Van Dike and hold one.

4. Alymkulov K., Zulpukarov A.Z. Uniform asymptotic of the solution of the boundary - value problem of the singularly perturbed equation with weak singular point at the degree one to four (in Russian). In the same place [3], 38-43.