THE AVERAGING OF CONTROL LINEAR FUZZY 2π-PERIODIC DIFFERENTIAL EQUATIONS

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Abstract. In this paper we will prove a possibility of use of the scheme of an average at research of the control linear fuzzy 2π-periodic differential equations with a small parameter.

Keywords. Fuzzy control system; Fuzzy differential equation; Small parameter; Averaging.

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1   Introduction and Preliminaries

As is generally known the absence of exact universal research methods for many important problems of analytical dynamics has caused the development of numerous approximate analytic and numerically-analytic methods that can be realized in effective computer algorithms.

The averaging methods combined with the asymptotic representations (in Poincare sense) began to be applied as the basic constructive tool for solving the complicated problems of analytical dynamics described by the differential equations. Averaging theory for ordinary differential equations has a rich history, dating to back to the work of N.M. Krylov and N.N. Bogoliubov [14], and has been used extensively in engineering applications [4,5,18,34,36,37]. Books that cover averaging theory for differential equations and inclusions include [8,13,17,22,31,32].

In recent years, the fuzzy set theory introduced by Zadeh [39] has emerged as an interesting and fascinating branch of pure and applied sciences. The applications of fuzzy set theory can be found in many branches of science as physical, mathematical, differential equations and engineering sciences.