



Nonlinear Dynamic Inequalities and Stability of Quasilinear Systems on Time Scales

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Abstract: In this paper a novel nonlinear integral inequality on time scale is proposed. This inequality is applied to analyze stability of zero solution of quasilinear dynamic equations on time scale. Also, stability conditions are established for a wide class of nonlinearities in the system of dynamic equations.

Keywords: *dynamic equations on time scales; nonlinear inequalities; stability; asymptotic stability.*

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1 Introduction

The method of integral inequalities of motion stability theory (see [8,9] and bibliography therein) has been developed in terms of linear and nonlinear integral inequalities treated in numerous papers (see [2,14] and bibliography therein). Appearance of dynamic equations on time scale [6] gave an impetus to the investigations in the theory of dynamic integral inequalities (see [3] and bibliography therein). The inequalities of Gronwall - Bellman type established by now and some types of nonlinear inequalities (see [4]) have been applied in the stability analysis of solutions to dynamic equations on time scale. It is of interest to further generalize nonlinear dynamic inequality of Stakhursky type (see [4, 10, 13]) for dynamic equations in the case of arbitrary real nonlinearity exponent larger than one. Such generalization makes possible the analysis of various types of stability of zero solution for a new class of quasilinear dynamic equations.

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