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UNIVERSITI PUTRA MALAYSIA
BERILMU BERBAKTI

INSPEM WEEKLY SEMINAR

05/2020



#UNSDG



Date & Time

Friday, 31st January 2020 @ 3.15 pm

Venue

al-Farabi Seminar Room,
Second Floor, INSPEM

Presenter

Prof. Dr. Rakhmatillo D. Alov
Faculty of Mathematics, National University of
Uzbekistan named after Mirzo Ulugbek,
Uzbekistan

Topic

Exponential stability (Lyapunov stability) of the solution
of hyperbolic systems

Abstract

The report is devoted to obtaining the algebraic condition for the exponential stability of the numerical solution of the upwind difference scheme for the mixed problem posed for one-dimensional symmetric t -hyperbolic systems in the inhomogeneous case when the characteristic velocities depend on the spatial variable. An a priori estimate of the numerical solution of the boundary-value difference problem is obtained. This estimate allows us to state the exponential stability of the numerical solution. The theorems on exponential stability of both the solution of a differential problem and the numerical solution of a boundary-value difference problem are proved. Easily verifiable algebraic conditions of exponential stability are given for both solving a differential problem and numerically solving a boundary-value difference problem. An example of numerical calculation is presented, which confirms the theoretical results obtained.

Keyword: Exponential stability, Difference scheme, Lyapunov function, Mixed problem, Hyperbolic system

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