ON A FIXED POINT THEOREM IN UNIFORM SPACES AND ITS APPLICATION TO NONLINEAR VOLterra TYPE OPERATORS

VASIL ANGELOV*, HRISTO KISKINOV**, ANDREY ZAHARIEV*** AND LJUBOMIR GEORGIEV*

*Department of Mathematics, University of Mining and Geology St. I. Rilski, 1700 Sofia, Bulgaria
E-mail: angelov@mgu.bg lubo_62@mgu.bg

**Faculty of Mathematics and Informatics, University of Plovdiv, 236 Bulgaria Blvd., 4003 Plovdiv, Bulgaria
E-mail: kiskinov@uni-plovdiv.bg

***Faculty of Mathematics and Informatics, University of Plovdiv, 236 Bulgaria Blvd., 4003 Plovdiv, Bulgaria
E-mail: zandrey@uni-plovdiv.bg

Abstract. In the present work, we prove a fixed point theorem for nonlinear operators acting in Hausdorff sequentially complete uniform spaces whose uniformity is generated by a saturated family of pseudometrics. As an application we consider nonlinear abstract Volterra type integral equations of second kind in the case when the independent variable belongs to arbitrary completely regular Hausdorff space. Existence and uniqueness of the solutions of these equations in nonhomogeneous case are also proved.

Key Words and Phrases: Fixed point, Volterra type integral equations, uniform space, pseudometrics, Hausdorff space.

2010 Mathematics Subject Classification: 47H10, 47J05, 54E15, 45N05, 45D09.

Acknowledgement. This research has been partially supported by Plovdiv University NPD grant NI13 FMI-002.

References


Received: June 24, 2014; Accepted: October 09, 2014.