DEPENDENCE SPACES II

EWA GRACZYŃSKA

This is a continuation of my lecture presented on 77th Workshop on General Algebra, 24th Conference for Young Algebraists in Potsdam (Germany) on 21st March 2009 and on the IM PAN seminar of prof. A. Obtułowicz. The Steinitz exchange lemma is a basic theorem in linear algebra used, for example, to show that any two bases for a finite-dimensional vector space have the same number of elements. According to F. Gécseg, H. Jürgensen – the result which is usually referred to as the "Exchange Lemma", states that for transitive dependence, every independent set can be extended to form a basis. Our aim is to discuss some interplay between the discussed notion by several authors. We present another proof of the result of N.J.S. Hughes of 1962–1966 on Steinitz' exchange theorem for infinite bases in connection with the notions of transitive dependence, independence and dimension as introduced in Cohn P.M., *Universal Algebra*, Harper and Row, New York, 1965. Revised edition, D. Reidel Publishing Co., Dordrecht, 1981 and Welsh, D.J.A., *Matroid Theory*, Academic Press, London, 1976. In the proof we assume Kuratowski-Zorn's Lemma, as a usual requirement.

E-mail address: egracz@eranet.pl