Adv. Math. Econ. 10, 1-29 (2007)

Advances in MATHEMATICAL ECONOMICS

Komlós type convergence for random variables and random sets with applications to minimization problems

C. Castaing[1] and M. Saadoune[2]

[1] Département de Mathématiques, Université Montpellier II, 34095 Montpellier Cedex 5, France

[2] Département de Mathématiques, Université Ibnou Zohr, Lot. Addalha, B.P. 8106, Agadir, Maroc

Received: August 10, 2006
Revised: October 16, 2006

JEL classification: C61

Mathematical Subject Classification (2000): 49J40, 49J45, 46N10

Abstract. Let E be a separable super reflexive Banach space and let $(\Omega, \mathcal{F}, \mu)$ be a complete probability space. We state some Komlós type theorems in the space $L^0_{cwk(E)}(\Omega, \mathcal{F}, \mu)$ of E-valued random variables and a version of Komlós slice theorem in the space $L^0_{cwk(E)}(\Omega, \mathcal{F}, \mu)$ of convex weakly compact random sets. Weak Komlós type theorems for some unbounded sequences in $L^1_F(\Omega, \mathcal{F}, \mu)$ and $L^1_{F^0}[F](\Omega, \mathcal{F}, \mu)$ when F is a separable Banach space are also stated. A Fatou type lemma in Mathematical Economics and minimization problems on convex and closed in measure subsets of $L^0_E(\Omega, \mathcal{F}, \mu)$ are presented. Further Minimization problems and Min-Max type results involving saddle-points and Young measures are also investigated.

Key words: Biting Lemma, Komlós convergence, minimization, Min-Max, saddle points, young measures