

COMPLETE MOMENT CONVERGENCE FOR WEIGHTED SUMS OF EXTENDED NEGATIVELY DEPENDENT RANDOM VARIABLES

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Abstract. In this paper, some results on complete moment convergence for weighted sums of extended negatively dependent (END, for short) random variables are established. The results extend and improve the result of Baum and Katz (1965) from complete convergence for non-weighted sums of independent random variables to the case of weighted sums of END random variables under mild conditions.

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REFERENCES

- [1] L. E. BAUM, M. KATZ, *Convergence rates in the law of large numbers*, Transactions of the American Mathematical Society **120** (1) (1965), 108–123.
- [2] Y. CHEN, K. C. YUEN, K. W. NG, *Precise large deviations of random sums in presence of negative dependence and consistent variation*, Methodology and Computing in Applied Probability **13** (2011), 821–833.
- [3] Y. S. CHOW, *Delayed sums and Borel summability of independent, identically distributed random variables*, Bulletin of the Institute of Mathematics, Academia Sinica **1** (2) (1973), 207–220.
- [4] Y. S. CHOW, *On the rate of moment convergence of sample sums and extremes*, Bulletin of the Institute of Mathematics, Academia Sinica **16** (3) (1988), 177–201.
- [5] P. ERDŐS, *On a theorem of Hsu and Robbins*, The Annals of Mathematical Statistics **20** (2) (1949), 286–291.
- [6] M. L. GUO, D. J. ZHU, *Equivalent conditions of complete moment convergence of weighted sums for ρ^* -mixing sequence of random variables*, Statistics and Probability Letters **83** (2013), 13–20.
- [7] A. GUT, *Complete convergence for arrays*, Periodica Mathematica Hungarica **25** (1) (1992), 51–75.
- [8] P. L. HSU, H. ROBBINS, *Complete convergence and the law of large numbers*, Proceedings of the National Academy of Sciences USA, **33** (1947), 25–31.
- [9] T. Z. HU, *Negatively superadditive dependence of random variables with applications*, Chinese Journal of Applied Probability and Statistics **16** (2000), 133–144.
- [10] K. JOAG-DEV, F. PROSCHAN, *Negative association of random variables with applications*, The Annals of Statistics **11** (1) (1983), 286–295.
- [11] M. L. KATZ, *The probability in the tail of a distribution*, The Annals of Mathematical Statistics **34** (1) (1963), 312–318.
- [12] L. LIU, *Precise large deviations for dependent random variables with heavy tails*, Statistics Probability Letters **79** (2009), 1290–1298.
- [13] L. LIU, *Necessary and sufficient conditions for moderate deviations of dependent random variables with heavy tails*, Science in China Series A: Mathematics **53** (2010), 1421–1434.
- [14] A. T. SHEN, *Probability inequalities for END sequence and their applications*, Journal of Inequalities and Applications, Vol. 2011, Article ID 98, 12 Pages, 2011.
- [15] A. T. SHEN, A. VOLODIN, *Weak and strong laws of large numbers for arrays of rowwise END random variables and their applications*, Metrika **80** (2017), 605–625.

- [16] A. T. SHEN, M. X. XUE, A. VOLODIN, *Complete moment convergence for arrays of rowwise NSD random variables*, Stochastics: An International Journal of Probability and Stochastic Processes **88** (4) (2016), 606–621.
- [17] A. T. SHEN, Y. ZHANG, W. J. WANG, *Complete convergence and complete moment convergence for extended negatively dependent random variables*, Filomat **31** (5) (2017), 1381–1394.
- [18] S. H. SUNG, *Moment inequalities and complete moment convergence*, Journal of Inequalities and Applications, Vol. 2009, Article ID 271265, 14 pages, 2009.
- [19] S. H. SUNG, *Complete convergence for weighted sums of ρ^* -mixing random variables*, Discrete Dynamics in Nature and Society, Vol. 2010, Article ID 630608, 13 pages, 2010.
- [20] S. J. WANG, X. J. WANG, *Precise large deviations for random sums of END real-valued random variables with consistent variation*, Journal of Mathematical Analysis and Applications **402** (2013), 660–667.
- [21] X. J. WANG, S. H. HU, *Complete convergence and complete moment convergence for martingale difference sequence*, Acta Mathematica Sinica, English Series **30** (2014), 119–132.
- [22] X. J. WANG, S. J. WANG, S. H. HU, J. M. LING, *On Complete convergence of weighted sums for arrays of rowwise extended negatively dependent random variables*, Stochastics: An International Journal of Probability and Stochastics Processes **85** (2013), 1060–1072.
- [23] X. J. WANG, L. L. ZHENG, C. XU, S. H. HU, *Complete consistency for the estimator of non-parametric regression models based on extended negatively dependent errors*, Statistics: A Journal of Theoretical and Applied Statistics **49** (2015), 396–407.
- [24] Y. WU, X. J. WANG, S. H. HU, *Complete moment convergence for weighted sums of weakly dependent random variables and its application in nonparametric regression model*, Statistical and Probability Letters **127** (2017), 56–66.
- [25] Y. F. WU, M. O. CABREA, A. VOLODIN, *Complete convergence and complete moment convergence for arrays of rowwise END random variables*, Glasnik Matematički **49** (69) (2014), 449–468.
- [26] Y. F. WU, J. Y. PENG, T. C. HU, *Limiting behaviour for arrays of row-wise END random variables under conditions of h -integrability*, Stochastics: An International Journal of Probability and Stochastics Processes **87** (3) (2015), 409–423.
- [27] W. Z. YANG, H. Y. XU, L. CHEN, S. H. HU, *Complete consistency of estimators for regression models based on extended negatively dependent errors*, Statistical papers, 2018, **59** (2) (2017), 449–465.