

ON THE STRONG LAW OF LARGE NUMBERS FOR WEIGHTED SUMS OF φ -MIXING RANDOM VARIABLES

HAIWU HUANG, DINGCHENG WANG AND JIANGYAN PENG

Abstract. Let $\{X_n, n \geq 1\}$ be a sequence of φ -mixing random variables with non-identical distribution and $\{a_{ni}; 1 \leq i \leq n, n \geq 1\}$ be an array of real constants. In this paper, we study the strong law of large numbers for the maximal weighted sums of φ -mixing random variables. The results obtained generalize and improve the previous known result of Bai and Cheng (Z.D. Bai and P.E. Cheng, 2000. *Marcinkiewicz strong laws for linear statistics. Statist. Probab. Lett. vol. 46, no. 2, pp. 105–112.*) for independent and identically distributed random variables to φ -mixing case.

Mathematics subject classification (2010): 60F15.

Keywords and phrases: φ -mixing random variables, strong law of large numbers, weighted sums.

REFERENCES

- [1] Z. D. BAI AND P. E. CHENG, *Marcinkiewicz strong laws for linear statistics*, Statistics and Probability Letters, vol. 46, no. 2, (2000), pp. 105–112.
- [2] X. J. WANG, S. H. HU, W. Z. YANG, Y. SHEN, *On complete convergence for weighted sums of φ -mixing random variables*, Journal of Inequalities and Applications, (2010), Article ID 372390, doi: 10.1155/2010/372390.
- [3] R. L. DOBRUSHIN, *The central limit theorem for non-stationary markov chain*, Theory of Probability and Its Applications, vol. 1, no. 4, (1956), pp. 72–88.
- [4] D. C. CHEN, *A uniform central limit theorem for nonuniform φ -mixing random fields*, The Annals of Probability, vol. 19, no. 2, (1991), pp. 636–649.
- [5] S. A. UTEV, *On the central limit theorem for φ -mixing arrays of random variables*, Theory of Probability and Its Applications, vol. 35, no. 1, (1990), pp. 131–139.
- [6] N. HERRNDORF, *The invariance principle for φ -mixing sequences*, Zeitschrift für Wahrscheinlichkeitstheorie und Verwandte Gebiete, vol. 63, no. 1, (1983), pp. 97–108.
- [7] M. PELIGRAD, *An invariance principle for φ -mixing sequences*, The Annals of Probability, vol. 13, no. 4, (1985), pp. 1304–1313.
- [8] X. J. WANG et al, *Moment inequality for φ -mixing sequences and its applications*, Journal of Inequalities and Applications, (2009), Article ID 379743, doi:10.1155/2009/379743.
- [9] X. J. WANG, S. H. HU, *Some Baum-Katz type results for φ -mixing random variables with different distributions*, RACSAM, vol. 106, no. 2, (2012), pp. 321–331.
- [10] Q. M. SHAO, *Almost sure invariance principles for mixing sequences of random variables*, Stochastic Processes and Their Applications, vol. 48, no. 2, (1993), pp. 319–334.
- [11] Q. Y. WU, *A strong limit theorem for weighted sums of sequences of negatively dependent random variables*, Journal of Inequalities and Applications, (2010), Article ID 383805, doi:10.1155/2010/383805.
- [12] S. C. YANG, *Some moment inequalities for partial sums of random variables and their application*, Chinese Science Bulletin, vol. 43, no. 17, (1998), pp. 1823–1828 (in Chinese).
- [13] X. C. ZHOU, *Complete moment convergence of moving average processes under φ -mixing assumptions*, Statistics and Probability Letters, vol. 80, (2010), pp. 285–292.
- [14] P. Y. CHEN, T. C. HU, A. VOLODIN, *Limiting behaviour of moving average processes under φ -mixing assumption*, Statistics and Probability Letters, vol. 79, (2009), pp. 105–111.