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THE MEAN CONSISTENCY OF THE WEIGHTED ESTIMATOR IN THE FIXED DESIGN REGRESSION MODELS BASED ON m–END ERRORS

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Abstract. In this paper, some moment inequalities for m-extended negatively dependent (m-END, for short) random variables are established which can be applied to investigate the nonparametric regression models based on m-END errors. Some results on mean consistency for the estimator in nonparametric regression models are presented. As an application, the consistency for the nearest neighbor estimator is obtained.

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REFERENCES

[1] P. Y. CHEN, P. BAI, S. H. SUNG, *The von Bahr-Esseen moment inequality for pairwise independent random variables and applications*, Journal of Mathematical Analysis and Applications **419** (2), 1290–1302, 2014.
[2] Y. CHEN, A. CHEN, K. W. NG, *The strong law of large numbers for extend negatively dependent random variables*, Journal of Applied Probability **47**, 908–922, 2010.
[3] A. A. GEORGIEV, *Local properties of function fitting estimates with applications to system identification*, in: W. Grossmann et al. (Eds.). Mathematical Statistics and Applications, Volume B, Proceedings 4th Pannonian Symposium on Mathematical Statistics, 4–10, September, 1983, Bad Tatzmannsdorf, Austria, Reidel, Dordrecht, 141–151, 1985.
[4] A. A. GEORGIEV, *Consistent nonparametric multiple regression: The fixed design case*, Journal of Multivariate Analysis **25** (1), 100–110, 1988.
[5] A. A. GEORGIEV, W. GREBLICKI, *Nonparametric function recovering from noisy observations*, Journal of Statistical Planning and Inference **13**, 1–14, 1986.
[6] S. H. HU, G. M. PAN, Q. B. GAO, *Estimate problem of regression model with linear process errors*, Applied Mathematics: A Journal of Chinese Universities **18** (1), 81–90, 2003.
[7] H. Y. LIANG, B. Y. JING, *Asymptotic properties for estimates of nonparametric regression models based on negatively associated sequences*, Journal of Multivariate Analysis **95** (2), 227–245, 2005.
[8] L. LIU, *Precise large deviations for dependent random variables with heavy tails*, Statistics and Probability Letters **79** (9), 1290–1298, 2009.
[9] L. LIU, *Necessary and sufficient conditions for moderate deviations of dependent random variables with heavy tails*, Science in China Series A: Mathematics **53** (6), 1421–1434, 2010.
[10] H. G. MÜLLER, *Weak and universal consistency of moving weighted averages*, Periodica Mathematica Hungarica **18** (3), 241–250, 1987.
[11] D. H. QIU, P. Y. CHEN, R. G. ANTONINI, A. VOLODIN, *On the complete convergence for arrays of rowwise extended negatively dependent random variables*, Journal of the Korean Mathematical Society **50** (2), 379–392, 2013.
[12] G. G. ROUSSAS, *Consistent regression estimation with fixed design points under dependence conditions*, Statistics and Probability Letters **8**, 41–50, 1989.
[13] G. G. ROUSSAS, L. T. TRAN, D. A. IOANNIDES, *Fixed design regression for time series: Asymptotic normality*, Journal of Multivariate Analysis **40** (2), 262–291, 1992.

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[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, *Bernstein-type inequality for widely dependent sequence and its application to nonparametric regression models*, Abstract and Applied Analysis, vol. 2013, Article ID 862602, 9 pages, 2013.

[16] A. T. SHEN, *On asymptotic approximation of inverse moments for a class of nonnegative random variables*, Statistics: A Journal of Theoretical and Applied Statistics **48** (6), 1371–1379, 2014.

[17] A. T. SHEN, *Complete convergence for weighted sums of END random variables and its application to nonparametric regression models*, Journal of Nonparametric Statistics **28** (4), 702–715, 2016.

[18] A. T. SHEN, Y. ZHANG, A. VOLODIN, *Applications of the Rosenthal-type inequality for negatively superadditive dependent random variables*, Metrika **78** (3), 295–311, 2015.

[19] L. TRAN, G. ROUSSAS, S. YAKOWITZ, B. T. VAN, *Fixed-design regression for linear time series*, The Annals of Statistics **24** (3), 975–991, 1996.

[20] X. J. WANG, S. J. WANG, S. H. HU, J. M. LING, Y. F. WEI, *On complete convergence of weighted sums for arrays of rowwise extended negatively dependent random variables*, Stochastics: An International Journal of Probability and Stochastic Processes **85** (6), 1060–1072, 2013.

[21] X. J. WANG, Y. WU, S. H. HU, *Exponential probability inequality for m-END random variables and its applications*, Metrika **79** (2), 127–147, 2016.

[22] Y. F. WU, M. GUAN, *Convergence properties of the partial sums for sequences of end random variables*, Journal of the Korean Mathematical Society **49** (6), 1097–1110, 2012.

[23] Y. F. WU, M. C. ORDONEZ, A. VOLODIN, *Complete convergence and complete moment convergence for arrays of rowwise end random variables*, Glasnik Matematički **49** (69), 449–468, 2014.

[24] W. Z. YANG, X. J. WANG, X. H. WANG, et al., *The consistency for estimator of nonparametric regression model based on NOD errors*, Journal of Inequalities and Applications, vol. 2012, Article ID 140, 13 pages, 2012.

[25] 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, doi:10.1007/s00362-016-0771-x, in press, 2016.