

ON THE MAXIMAL INEQUALITIES FOR CONDITIONAL DEMIMARTINGALES

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Abstract. In this paper, based on a Fubini formula of conditional expectation and a maximal inequality for conditional demimartingales, we extend some inequalities of demimartingales to the case of conditional demimartingales. Meanwhile, we obtain some maximal ϕ -inequalities for conditional demimartingales and some maximal inequalities of concave Young functions for conditional demimartingales.

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REFERENCES

- [1] N. K. AGBEKO, *Concave function inequalities for sub-(super-)martingales*, Ann. Univ. Sci. Budapest. Sect. Math. **29** (1986), 9–17.
- [2] G. ALSMEYER, U. RÖSLER, *Maximal ϕ -inequalities for nonnegative submartingales*, Theory Probab. Appl. **50**, 1 (2006), 118–128.
- [3] Y. S. CHOW, H. TEICHER, *Probability Theory: Independence, Interchangeability, Martingales*, 2nd ed. Springer-Verlag, New York, 1988.
- [4] T. C. CHRISTOFIDES, *Maximal inequalities for demimartingales and a strong law of large numbers*, Statist. Probab. Lett. **50**, 4 (2000), 357–363.
- [5] T. C. CHRISTOFIDES, *U-statistics on associated random variables*, J. Statist. Plann. Inference **119**, 1 (2004), 1–15.
- [6] T. C. CHRISTOFIDES, M. HADJIKYRIAKOU, *Maximal and moment inequalities for demimartingales and N-demimartingales*, Statist. Probab. Lett. **82**, 3 (2012), 683–691.
- [7] T. C. CHRISTOFIDES, M. HADJIKYRIAKOU, *Conditional demimartingales and related results*, J. Math. Anal. Appl. **398**, 1 (2013), 380–391.
- [8] J. ESARY, F. PROSCHAN, D. WALKUP, *Association of random variables with applications*, Ann. Math. Statist. **38**, 5 (1967), 1466–1474.
- [9] X. B. GONG, *Maximal ϕ -inequalities for demimartingales*, J. Inequal. Appl. **2011**, 59 (2011).
- [10] M. HADJIKYRIAKOU, *Probability and moment inequalities for demimartingales and associated random variables*, Ph. D. Dissertation, University of Cyprus, 2010.
- [11] S. H. HU, X. H. WANG, W. Z. YANG, X. J. WANG, *Some inequalities for demimartingales and N-demimartingales*, Statist. Probab. Lett. **82**, 2 (2012), 232–239.
- [12] C. M. NEWMAN, A. L. WRIGHT, *Associated random variables and martingale inequalities*, Z. Wahrsch. Verw. Geb. **59**, 3 (1982), 361–371.
- [13] B. L. S. PRAKASA RAO, *On some maximal inequalities for demisubmartingales and N-demisupermartingales*, J. Inequal. Pure Appl. Math. **8**, 4 (2007), Article 112.
- [14] B. L. S. PRAKASA RAO, *Conditional independence, conditional mixing and conditional association*, Ann. Inst. Stat. Math. **61**, 2 (2009), 441–460.
- [15] B. L. S. PRAKASA RAO, *Remarks on maximal inequalities for non-negative demisubmartingales*, Statist. Probab. Lett. **82**, 7 (2012), 1388–1390.
- [16] B. L. S. PRAKASA RAO, *Associated Sequences, Demimartingales and Nonparametric Inference*, Springer Basel AG, 2012.
- [17] G. G. ROUSSAS, *On conditional independence, mixing, and association*, Stoch. Anal. Appl. **26**, 6 (2008), 1274–1309.

- [18] J. F. WANG, *Maximal inequalities for associated random variables and demimartingales*, Statist. Probab. Lett. **66**, 3 (2004), 347–354.
- [19] X. H. WANG, X. J. WANG, *Some inequalities for conditional demimartingales and conditional N -demimartingales*, Statist. Probab. Lett. **83**, 3 (2013), 700–709.
- [20] X. J. WANG, S. H. HU, *Maximal inequalities for demimartingales and their applications*, Sci. China Ser. A, Math. **52**, 10 (2009), 2207–2217.
- [21] X. J. WANG, S. H. HU, T. ZHAO, W. Z. YANG, *Doob's type inequalities and strong law of large numbers for demimartingales*, J. Inequal. Appl. **2010**, Art. ID 838301, 11 pp.
- [22] X. J. WANG, B. L. S. PRAKASA RAO, S. H. HU, W. Z. YANG, *On some maximal inequalities for demimartingales and N -demimartingales based on concave Young functions*, J. Math. Anal. Appl. **396**, 2 (2012) 434–440.
- [23] D. M. YUAN, Y. K. YANG, *Conditional versions of limit theorems for conditionally associated random variables*, J. Math. Anal. Appl. **376**, 1 (2011), 282–293.