

**Tian, Weizhong; Wang, Tonghui**

**Quadratic forms of refined skew normal models based on stochastic representation.** (English)

Zbl 1375.60051

Random Oper. Stoch. Equ. 24, No. 4, 225-234 (2016).

Summary: In [J. Multivariate Anal. 100, No. 3, 533–545 (2009; Zbl 1154.62342)], the second author et al. first introduced the skew chi-square distribution based on the multivariate skew normal distribution provided by *A. Azzalini* [Scand. J. Stat. 12, 171–178 (1985; Zbl 0581.62014)], and *R. Ye* et al. [J. Multivariate Anal. 131, 229–239 (2014; Zbl 1298.62086)] extended this results into the skew Wishart distribution. Motivated by these results, we first study a new type of multivariate skew normal distribution introduced by *A. K. Gupta* and *J. T. Chen* [Ann. Inst. Stat. Math. 56, No. 2, 305–315 (2004; Zbl 1056.62064)], the moment generating function, independence and quadratic form are discussed, and also a new type of skew chi-square distribution was introduced. Later on, we defined a new type of skew Wishart distribution based on the matrix skew normal models introduced by *W. Ning* [Random Oper. Stoch. Equ. 23, No. 1, 21–29 (2015; Zbl 1310.62065)]. In the end, we will study the probabilistic representation of multivariate skew elliptical models.

**MSC:**

60E05 Probability distributions: general theory

62H05 Characterization and structure theory for multivariate probability distributions; copulas

Cited in 2 Documents

**Keywords:**

skew normal distribution; quadratic form; moment generating function

**Full Text:** DOI

**References:**

- [1] Arellano-Valle R., Ozan S., Bolfarine H. and Lachos V., Skew normal measurement error models, J. Multivariate Anal. 96 (2005), no. 2, 265-281. · Zbl 1077.62043
- [2] Azzalini A., A class of distributions which includes the normal ones, Scand. J. Stat. 12 (1985), 171-178. · Zbl 0581.62014
- [3] Azzalini A. and Capitanio A., Statistical applications of the multivariate skew normal distribution, J. R. Stat. Soc. Ser. B. Stat. Methodol. 61 (1999), no. 3, 579-602. · Zbl 0924.62050
- [4] Azzalini A. and Dalla A., The multivariate skew-normal distribution, Biometrika 83 (1996), no. 4, 715-726. · Zbl 0885.62062
- [5] Branco M. and Dey D., A general class of multivariate skew-elliptical distributions, J. Multivariate Anal. 79 (2001), no. 1, 99-113. · Zbl 0992.62047
- [6] Chen J. and Gupta A., Matrix variate skew normal distributions, Statistics 39 (2005), no. 3, 247-253. · Zbl 1070.62039
- [7] Domínguez-Molina J. A., González-Farías G., Ramos-Quiroga R. and Gupta A. K., A matrix variate closed skew-normal distribution with applications to stochastic frontier analysis, Comm. Statist. Theory Methods 36 (2007), no. 9, 1691-1703. · Zbl 1122.62043
- [8] Fang K. and Zhang Y., Generalized Multivariate Analysis, Springer, New York, 1990.
- [9] Genton M. G., Skew-Elliptical Distributions and Their Applications: A Journey Beyond Normality, CRC Press, Boca Raton, 2004. · Zbl 1069.62045
- [10] Genton M., He L. and Liu X., Moments of skew-normal random vectors and their quadratic forms, Statist. Probab. Lett. 51 (2001), no. 4, 319-325. · Zbl 0972.62031
- [11] Gupta A. and Huang W., Quadratic forms in skew normal variates, J. Math. Anal. Appl. 273 (2002), no. 2, 558-564. · Zbl 1005.62058
- [12] Gupta A. K. and Chen J. T., A class of multivariate skew-normal models, Ann. Inst. Statist. Math. 56 (2004), no. 2, 305-315. · Zbl 1056.62064
- [13] Harrar S. W. and Gupta A. K., On matrix variate skew-normal distributions, Statistics 42 (2008), no. 2, 179-194. · Zbl 1281.62132
- [14] Henze N., A probabilistic representation of the 'skew-normal' distribution, Scand. J. Stat. 13 (1986), 271-275. · Zbl 0648.62016

- [15] Ning W., Probabilistic representations of matrix variate skew normal models, *Random Oper. Stoch. Equ.* 23 (2015), no. 1, 21-29. · [Zbl 1310.62065](#)
- [16] Székely G. and Rizzo M., A new test for multivariate normality, *J. Multivariate Anal.* 93 (2005), no. 1, 58-80. · [Zbl 1087.62070](#)
- [17] Wang T., Li B. and Gupta A., Distribution of quadratic forms under skew normal settings, *J. Multivariate Anal.* 100 (2009), no. 3, 533-545. · [Zbl 1154.62342](#)
- [18] Ye R., Wang T. and Gupta A., Distribution of matrix quadratic forms under skew-normal settings, *J. Multivariate Anal.* 131 (2014), 229-239. · [Zbl 1298.62086](#)
- [19] Zacks S., *Parametric Statistical Inference: Basic Theory and Modern Approaches*, Elsevier, Amsterdam, 2014.

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.