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On a new transformation to normality. (English) Zbl 0564.62012
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A Gaussian approximation to the distribution of the non-negative random variable Y is developed using the *E. B. Wilson* and *M. M. Hilferty* [*Proc. Natl. Acad. Sci. USA* 17, 684-688 (1931; [Zbl 0004.36005](#))] approach. This approximation uses the symmetrizing transformation $((Y + b)/k_1)^h$ where k_1 is the first moment of Y and h and b are determined from the first three cumulants of Y .

The approximation is illustrated in the case in which Y is a non-central chi-square, where numerical evaluations indicate that the new transformation is an improvement over existing ones especially for small values of k_1 .

MSC:

[62E20](#) Asymptotic distribution theory in statistics
[62E99](#) Statistical distribution theory

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transformation to normality; Wilson-Hilferty approximation; Gaussian approximation; non-negative random variable; symmetrizing transformation; cumulants; non-central chi-square

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References:

- [1] Abdel-Aty S.H., *Biometrika* 41 pp 538– (1954)
- [2] Fisher R.A., *JRSS, Ser A* 85 pp 87– (1922)
- [3] Jensen D.R., *JASA* 67 pp 898– (1972)
- [4] Johnson N.L., *Continuois Univariate Distributions-1*
- [5] Moschopoulos P.G., *Comm. Stat.* 12 (1983)
- [6] Mudholkar G.S., *JASA* 76 (374) pp 479– (1981) · [doi:10.1080/01621459.1981.10477673](https://doi.org/10.1080/01621459.1981.10477673)
- [7] Patnaik P.B., *Biometrika* 36 (374) pp 202– (1949)
- [8] Pearson E.S., *Biometrika* 46 (374) pp 364– (1959) · [Zbl 0101.35806](#) · [doi:10.2307/2333533](https://doi.org/10.2307/2333533)
- [9] Wilson E.P., *Proceedings of the National Academy of Science* 17 (374) pp 684– (1931) · [Zbl 0004.36005](#) · [doi:10.1073/pnas.17.12.684](https://doi.org/10.1073/pnas.17.12.684)

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