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Comparing the Distributions of Sums of Independent Random Vectors

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Abstract: Let $(X_n, n \geq 1), (\tilde{X}_n, n \geq 1)$ be two sequences of i.i.d. random vectors with values in ^{k} and $S_n = X_1 + \cdots + X_n$, $\tilde{S}_n = \tilde{X}_1 + \cdots + \tilde{X}_n$, $n \geq 1$. Assuming that $EX_1 = E\tilde{X}_1$, $E|X_1|^2 < \infty$, $E|\tilde{X}_1|^{k+2} < \infty$ and the existence of a density of $\tilde{X}_1$ satisfying the certain conditions we prove the following inequalities:

$$(S_n, \tilde{S}_n) \leq c \ \max\left\{(X_1, \tilde{X}_1), \zeta_2(X_1, \tilde{X}_1)\right\}, \quad n = 1, 2, \ldots,$$

where and ζ_2 are the total variation and Zolotarev's metrics, respectively.

Keywords: sum of random vectors; the total variation distance; bound of closeness;
Zolotarev's metric; characteristic function;

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