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FINITE DIFFERENCE EQUATIONS AND CONVERGENCE RATES IN THE CENTRAL LIMIT THEOREM

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Abstract: We apply the theory of finite difference equations to the central limit theorem, using interpolation of Banach spaces and Fourier multipliers. Let S_n^* be a normalized sum of i.i.d. random vectors, converging weakly to a standard normal vector $\mathcal{N}$. When does $\|Eg(x+S_n^*)-Eg(x+\mathcal{N})\|_{L_p(dx)}$ tend to zero at a specified rate? We show that, under moment conditions, membership of g in various Besov spaces is often sufficient and sometimes necessary. The results extend to signed probability.

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