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Esseen's contribution and recent results in investigation of the rate of convergence in the central limit theorem

Monday, September 17, 2018 11:15 AM (50 minutes)

Starting from the central limit theorem due to Lyapunov we give an overview of Esseen's fundamental results in investigation of the rate of convergence in the CLT. We present a wide class of Berry-Esseen-type inequalities providing estimates of the accuracy of the normal approximation to distributions of sums of independent random variables in various metrics and involving various integral-type characteristics of the random summands coming back to the pioneer works of Berry (1941), Esseen (1942, 1969), and Osipov (1965). Finally, being inspired by Esseen's asymptotic expansion (1945) we provide a new asymptotic and still explicit moment-type estimate of the rate of convergence in the CLT which is optimal in the sense that it's main term as a function of the standardized average third-order moment of random summands coincides with that in Esseen's asymptotic expansion for the Kolmogorov distance. We also look at the problem of classification of the appearing asymptotically exact constants and present their exact values or two-sided bounds.

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