

Abstract

The DeMoivre-Laplace Theorem states that the binomial probability distribution $B(N, 1/2)$ tends for $N \rightarrow \infty$ to the Gaussian distribution. We extend this theorem to the difference quotients of the family of the binomial distributions with varying N , showing that they converge to the corresponding differential quotients of the time-dependent Gaussian distribution. The convergence holds for difference quotients of all order.

Keywords: Binomial distribution, Pascal Triangle, Gaussian distribution, DeMoivre-Laplace Theorem, difference quotients, discrete heat equation, nonstandard analysis.

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