



Technology-Based Hypergeometric Function: A Distribution of Probability

Ganesh Choudhary, Research Scholar, Department of Mathematics, Maharaja Ganga Singh University, Bikaner (Rajasthan).

Abstract

The hypergeometric distribution is one of the most important discrete probability models for finite population sampling without replacement. With the increasing use of computational technologies, statistical methods based on the hypergeometric function have become valuable tools in data analysis, information retrieval, quality control, bioinformatics, communication systems, and decision support applications. This paper presents an overview of the hypergeometric probability distribution and discusses its significance in technology-based environments. The mathematical formulation of the distribution is examined along with its computational implementation for solving real-world problems involving finite populations. The study demonstrates how advances in computing technology enable faster probability estimation, improved simulation, and efficient processing of large datasets. Furthermore, the applicability of the hypergeometric distribution in modern technological systems is highlighted through examples related to pattern recognition, network analysis, and reliability assessment. The results indicate that integrating hypergeometric probability models with computational techniques enhances analytical accuracy and supports effective decision-making in engineering and scientific research. The paper concludes that the hypergeometric distribution remains a powerful statistical tool whose relevance has expanded significantly with the development of modern information technology.

Keywords: Hypergeometric Distribution, Probability Theory, Hypergeometric Function, Technology-Based Applications, Statistical Computing