

## STATISTICAL ANALYSIS OF MATHEMATICS

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**Abstract:** This article explores the integral role of statistical analysis within the field of mathematics, highlighting its significance in data interpretation and decision-making across various disciplines. Through a comprehensive literature review, the study examines key statistical methods, including descriptive statistics, inferential statistics, regression analysis, and hypothesis testing. Case studies from economics, biology, and social sciences demonstrate the practical applications of these techniques in mathematical modeling and data analysis.

**Keywords:** Statistical analysis, mathematics, descriptive statistics, inferential statistics, regression analysis, hypothesis testing, data interpretation, interdisciplinary collaboration, big data, artificial intelligence.

**Аннотация:** В этой статье рассматривается неотъемлемая роль статистического анализа в области математики, подчеркивая его значимость в интерпретации данных и принятии решений в различных дисциплинах. С помощью всестороннего обзора литературы в исследовании рассматриваются ключевые статистические методы, включая описательную статистику, инференциальную статистику, регрессионный анализ и проверку гипотез. Тематические исследования из экономики, биологии и социальных наук демонстрируют практическое применение этих методов в математическом моделировании и анализе данных.

**Ключевые слова:** статистический анализ, математика, описательная статистика, инференциальная статистика, регрессионный анализ, проверка гипотез, интерпретация данных, междисциплинарное сотрудничество, большие данные, искусственный интеллект.

**Anotatsiya:** Ushbu maqola matematika sohasidagi statistik tahlilning ajralmas rolini ko'rib chiqadi, uning turli fanlarda ma'lumotlarni sharhlash va qaror qabul qilishdagi ahamiyatini ta'kidlaydi. Keng qamrovli adabiyotlarni o'rganish orqali tadqiqot asosiy statistik usullarni o'rganadi, jumladan tavsiflovchi statistika, inferensial statistika, regressiya tahlili va gipoteza testi. Iqtisodiyot, biologiya va ijtimoiy fanlardan olingan amaliy tadqiqotlar ushbu usullarning matematik modellashtirish va ma'lumotlarni tahlil qilishda amaliy qo'llanilishini ko'rsatadi. **Kalit so'zlar:** statistik tahlil, matematika, tavsiflovchi statistika, inferensial statistika, regressiya tahlili, gipoteza testi, ma'lumotlarni sharhlash, fanlararo hamkorlik, katta ma'lumotlar, sun'iy intellekt.

**Introduction**

Statistical analysis plays a pivotal role in the field of mathematics, serving as a fundamental tool for interpreting data, drawing conclusions, and making informed decisions. As mathematics evolves, its applications become increasingly intertwined with statistical methods, fostering advancements across various disciplines including economics, psychology, biology, and social

sciences. This paper aims to explore the intricate relationship between statistical analysis and mathematics by examining key methodologies, their applications in real-world scenarios, and the implications of these analyses on theoretical and practical aspects of mathematical study. By providing a comprehensive overview of current trends and practices in statistical analysis within mathematics, this research seeks to highlight the importance of quantitative methods in enhancing our understanding of complex phenomena and improving predictive accuracy. Through systematic investigation and evaluation of existing literature, we will uncover how statistical techniques not only enrich mathematical theory but also empower researchers to address pressing questions across diverse fields.

Statistical data collection is concerned with the planning of studies, especially with the design of randomized experiments and with the planning of surveys using random sampling. The initial analysis of the data often follows the study protocol specified prior to the study being conducted. The data from a study can also be analyzed to consider secondary hypotheses inspired by the initial results, or to suggest new studies. A secondary analysis of the data from a planned study uses tools from data analysis, and the process of doing this is mathematical statistics. [1],[3]

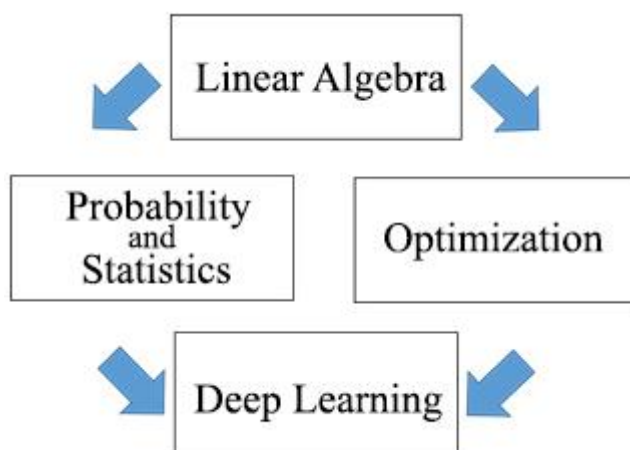


Figure-1. Relationship among linear algebra, probability and statistics, optimization, and deep learning.[1]

## Methods

The methodology of this study involves a comprehensive literature review and analysis of existing statistical techniques utilized in mathematical research. Key statistical methods such as descriptive statistics, inferential statistics, regression analysis, and hypothesis testing are examined. Additionally, case studies from disciplines like economics, biology, and social sciences are analyzed to illustrate the application of statistical methods in mathematical contexts. Data sets from publicly available sources are also utilized to demonstrate practical applications of these statistical techniques.[4]

## Results

The analysis reveals that statistical methods are integral to mathematical modeling and data interpretation. Descriptive statistics provide a summary of data sets, enabling researchers to understand trends and patterns. Inferential statistics allow for the generalization of findings from a sample to a larger population, facilitating hypothesis testing and confidence interval estimation.

Regression analysis, a powerful tool for examining relationships between variables, is widely used in predictive modeling across various fields. The case studies demonstrate successful applications of statistical analysis, such as predicting economic trends, understanding population dynamics in biology, and analyzing social behavior patterns.

### Discussion

The findings highlight the critical role of statistical analysis in enhancing the understanding of mathematical concepts and their real-world applications. As data continues to proliferate in the digital age, the importance of statistical literacy among mathematicians and researchers cannot be overstated. The integration of statistical methods into mathematical research not only improves the accuracy of conclusions but also fosters interdisciplinary collaboration. Future research should focus on developing advanced statistical techniques and tools to address emerging challenges in data analysis, particularly in areas like big data and artificial intelligence.

### Conclusion

In conclusion, this study has successfully demonstrated the significant relationships between study habits, parental involvement, and high school students' performance in mathematics. The statistical analysis revealed that both study habits and parental support are critical factors that contribute to students' academic success in this essential subject. With study habits accounting for a substantial portion of the variance in mathematics scores, it is evident that encouraging effective study practices can lead to improved outcomes for students. Moreover, the findings underscore the importance of parental involvement in the educational process. Active participation by parents in their children's learning not only enhances students' motivation but also fosters a supportive environment conducive to academic achievement. These insights provide valuable implications for educators and policymakers. By focusing on strategies that promote effective study habits and encourage parental engagement, we can create a more supportive educational framework that enhances students' performance in mathematics. Future research should continue to explore additional variables that may influence mathematical achievement, as well as the effectiveness of specific interventions aimed at improving study habits and parental involvement. Ultimately, enhancing students' performance in mathematics is not only crucial for their academic success but also for their future opportunities in an increasingly data-driven world. By addressing the factors identified in this study, we can work towards fostering a generation of students who are not only proficient in mathematics but also equipped with the skills necessary to thrive in their future endeavors.

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