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Numerical Analysis

Numerical analysis is the backbone of modern mathematical computation, bridging the gap between theoretical mathematics and practical applications. It encompasses a variety of techniques aimed at solving mathematical problems through numerical approximation and computation. From solving differential equations to optimizing complex systems, numerical analysis plays a crucial role in diverse fields such as engineering, physics, finance, and computer science.

One of the fundamental aspects of numerical analysis is the development and analysis of numerical algorithms. These algorithms allow us to approximate solutions to mathematical problems that may be intractable to solve analytically. Through careful design and analysis, numerical analysts ensure that these algorithms are not only efficient but also accurate and reliable.

Furthermore, numerical analysis involves studying the behavior of these algorithms under various conditions, such as round-off errors and convergence properties. This understanding is essential for assessing the reliability of numerical results and for developing strategies to improve the accuracy and efficiency of computational methods.

In essence, numerical analysis empowers mathematicians and scientists to tackle real-world problems that defy analytical solutions. By leveraging the power of computation, numerical analysts continue to push the boundaries of knowledge and innovation across numerous disciplines, making it an indispensable tool in the modern scientific toolkit.