ACCELERATING CONVERGENCE: A COMPARATIVE STUDY OF SUCCESSIVE OVER RELAXATION METHOD FOR SOLVING LINEAR EQUATIONS

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ABSTRACT

This research project focuses on a comparative study of successive over-relaxation (SOR) methods, including Successive Over Relaxation (SOR), Refinement of Successive Over-Relaxation (RSOR), and Scaled Successive Over-Relaxation (SSOR). The objectives of the study are to solve linear equations using these methods, analyze their efficiency based on the number of iterations, and determine the best method among them. The project addresses the challenges of determining the value of omega (ω), selecting suitable formulas for each method, and identifying the best approximation methods. The significance of the project lies in enhancing the understanding of SOR, RSOR, and SSOR methods, selecting appropriate formulas, and developing techniques for calculating accurate approximations. The research successfully obtains solutions and determines their values based on the provided equations and problem statements. The study concluded that after a comprehensive analysis, the RSOR method proved to be the most efficient among the three methods examined. Ultimately, the goal of identifying the best method was accomplished, with the RSOR method emerging as the most effective approach. This method surpassed both SOR and SSOR methods in terms of solving linear equations, displaying superior efficiency and accuracy.

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