

## **A brief journey to the past of iterative methods for solving sparse linear systems**

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Seventy five years ago, solving a linear system by an iterative methods meant using a relaxation-type method, also known as a stationary iterative method. In fact, the major papers that gave us the convergence theory we know today for these methods were from that era: 1948 [Stein-Rosenberg], Southwell [1946], Frankel [1950] and Young [1950,1954], among others. At the same time as these methods were getting well understood, Krylov subspace techniques made their appearance: The Conjugate Gradient method and a variant were discovered independently by Hesteness and Stiefel [1952] and by Lanczos [1950, 1952]. A flurry of activity followed as practitioners found many advantages to these 'optimal' techniques. A third push forward in the development of practical iterative methods is undoubtedly the emergence of preconditioning techniques. Although these were known in various forms in earlier decades, a major milestone was the discovery of Incomplete LU factorization methods in a 1977 paper by Meijerink and Van -der Vorst. This talk will give an overview of iterative methods for linear systems, emphasizing a historical perspective and ending with comments on what problems still remain unsolved.