

IDR(s): A NEW FAMILY OF EFFICIENT ALGORITHMS FOR SOLVING LARGE NONSYMMETRIC LINEAR SYSTEMS

Martin van Gijzen (Delft University of Technology)
joint work with
Peter Sonneveld (Delft University of Technology)

We present a new family of iterative methods for solving nonsymmetric systems of linear equations. Our technique is a generalisation of the Induced Dimension Reduction algorithm of Sonneveld. The method uses a limited amount of memory: only a modest (fixed) number of vectors is needed to carry out the iterative process. We will present the theoretical framework of the new technique and illustrate its performance with numerical experiments on realistic test problems from several applications including ocean circulation and wave propagation. Our numerical experiments show that our technique frequently outperforms state-of-the-art short-recurrence methods Krylov methods such as Bi-CGSTAB, Bi-CGstab(1), and CGS.