Two-Level Preconditioned CG Methods derived from Deflation, Domain Decomposition and Multigrid.

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ABSTRACT

For various applications, it is well-known that a two-level PCG method is an efficient method for solving large and sparse linear systems. A combination of traditional and projection-type preconditioners is used to effectively treat the effect of both small and large eigenvalues of the coefficient matrix. The resulting two-level PCG methods are known in literature, coming from the fields of deflation, domain decomposition and multigrid. At first glance, these methods seem to be different. However, from an abstract point of view, it can be shown that some of them are closely related to each other and some of them are even equivalent. The aim of this talk is to compare these two-level PCG methods both theoretically and numerically. We show that the different fields are strongly connected to each other.

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