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**Deflation Techniques for Preconditioned Gradient
Subspace Iterations**

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Simultaneous computation of several eigenpairs by subspace iteration has two
important advantages over computing them successively by single vector iter-
ations with deflation: (i) generally faster convergence to extreme eigenpairs,
and (ii) 'cluster robustness', that is, the ability to efficiently compute clustered
eigenvalues. However, when the number of computed eigenpairs is large, so is
the computational cost per iteration, and in order to reduce this cost one has to
resort to this or that deflation technique that would allow to effectively remove
the eigenpairs computed to a desired accuracy from the computation. This pa-
per discusses various deflation techniques that can be used in the framework
of the so-called preconditioned gradient subspace iterations, which combine the
preconditioned steepest descent and its conjugate gradient accelerations with
the Rayleigh-Ritz method.