
Alex Breuer
**Heterogeneous resolution of commute time embedding
features in Krylov subspaces**

ATTN: RDRL-CI-N
Bldg 120
Aberdeen Proving Ground
MD 21005
`alexander.m.breuer.civ@mail.mil`

Computing the eigenvectors needed for a commute-time embedding using the truncated SVD is expensive when the problem is nontrivial. One may use approximate eigenvectors instead, and significant computational savings may result; in particular Krylov subspaces have been suggested for this purpose. One may witness that global features of the graph emerge before local detail is resolved. We show that this heterogeneous resolution of graph features is an innate property of Krylov subspace approximations. Error of global structure shrinks at an asymptotically faster rate than the error of local detail. We also notice that a similar behavior results for other Krylov subspace approximations of dimension reduction methods that use eigenvector projections.