Introducing the original PageRank algorithm used the Power method to compute successive iterates that converge to the principal eigenvector of Markov Matrix representing the web link graph. The algorithm, presented here, called Quadratic Extrapolation accelerates the convergence of Power method by periodically subtracting off estimates of the nonprincipal eigenvectors from the current iterate of the Power Method.

Methods (cont):

Quadratic Extrapolation:
The Quadratic Extrapolation iteration starts with a vector, which is a linear combination of 3 eigenvectors (could be randomly chosen). So at every iteration, it periodically subtracts off estimates of the nonprincipal eigenvector from the current iterate of the Power Method.

Algorithm 2: Quadratic Extrapolation Algorithm

Summary:
- Quadratic Extrapolation is a simple technique that requires little addition infrastructure to integrate into the standard power method.
- Additionally, the extrapolation step need only be applied periodically to enhance the convergence of the PageRank.

Conclusions:
For Web graphs containing a billion nodes, computing a PageRank vector can take several days. Computing PageRank quickly is necessary to reduce the lag time from when a new crawl is completed to when that crawl can be made available for searching.

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Results:
Figure 3: Comparison of convergence rates for Power Method and Quadratic Extrapolation. Note the Quadratic Extrapolation convergences faster than the Power Method.