Performance Study

Strong Scaling
Number of pages (matrix shape) = 1000
Max iterations: 30

Number of MPI ranks	Total Time
2	1.233929
5	1.010658
10	0.948826
15	0.934777
20	0.992467
25	1.007636
35	1.070955
45	1.058260
55	1.083374
60	1.150670

Weak Scaling
Number of MPI ranks = 25
Max iterations: 30

Number of pages	Total Time
50	0.022950
100	0.031524
500	0.296735
1000	1.007636
2000	11.536185
3000	31.840089
5000	85.480386
10000	343.753117

Strong scaling and weak scaling is done. There is a variation in total time each time when the program is run. Number of pages, maximum iterations, testing or random run, etc can be controlled using NUM_PAGES, ITERR, test_and_debug in the code.

When not testing, the default 1 initialised L matrix is randomised by making certain number of positions in each row, zeros. Seed is set based on the global row index of the L matrix. Convergence and maximum number of iterations are used as the stop condition for the power iteration. The power iteration gives us the rank vector, whose maximum eigenvalue is calculated using by the Rayleigh-Quotient. Each step is parallelised using MPI.

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