Global and local reordering

Global reordering

There are possibly more than one matching that maximizes the trace with the constraint on the diagonal, depending on the value of the threshold/cutoff of the diagonal. The larger threshold is on the diagonal, the more feasible elements are in the matrix, and the more matching is satisfactory. The threshold is obtained by max-flow method, and then the matching is determined by Hungarian algorithm. These two steps consist our global reordering. Since the matching is in terms of row (particle), only row permutations will be performed. It does not make any difference if we allow column permutations. This is because the set of all row permutations is equivalent to the set of all column permutations.

Local reordering

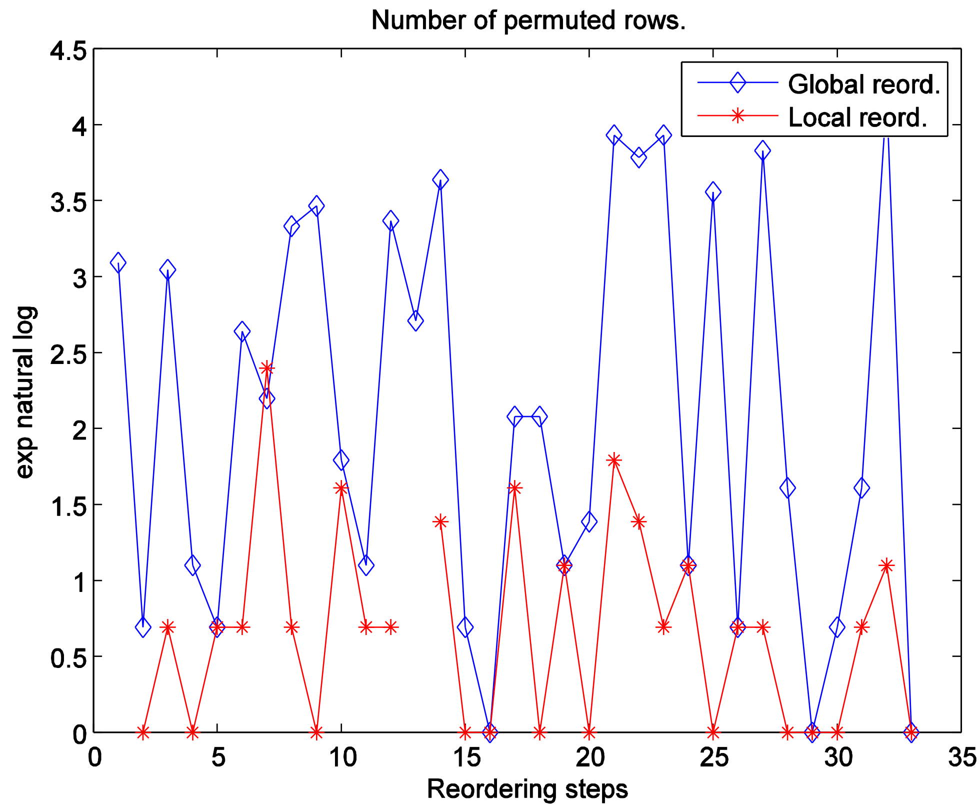
As the name implies, the local reordering is very much the same as the global one, except it performs on a smaller matrix instead of the entire matrix. Thus the first step in local reordering is to construct the smaller matrix. Since only row permutations are considered, the smaller matrix will be determined by the selected rows. At present, our local rows consist of two parts. The first part is rows from the column that has the smallest diagonal element. The second part is rows that close to the row that has the smallest diagonal element.

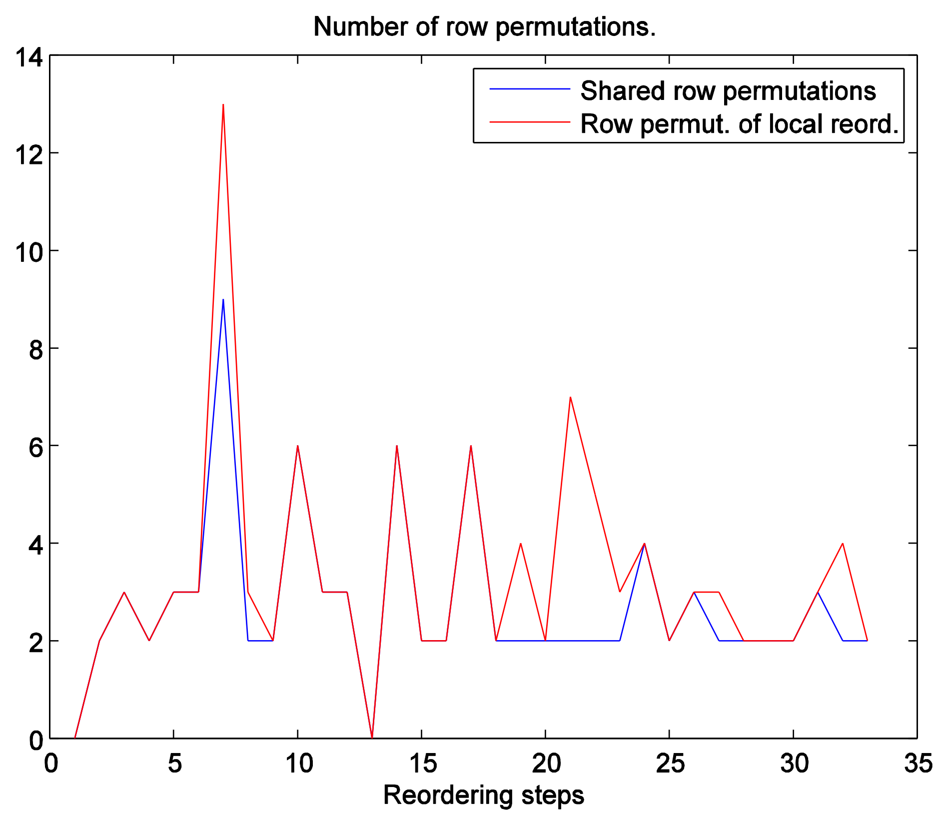
Comparison of two reordering

In this test, we start from the matrix after one global reordering which gives us a global threshold on the diagonal. Then we apply both reordering whenever the smallest diagonal element is less than the threshold.

Num. of permuted rows	MC step					
	14	243	421	454	857	907
Global	4	24	5	3	20	10
Local	2	3	2	3	3	13
Shared	2	3	2	3	3	9
Size of local	58	60	57	62	58	70

Num. of permutations	MC step					
	14	243	421	454	857	907
Global	2	21	3	2	14	9
Local	1	2	1	2	2	11
shared	1	2	1	2	2	9


Number of permuted rows.
Global reord.
Local reord.
exp natural log
Reordering steps
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
0
5
10
15
20
25
30
35


Number of row permutations.
Shared row permutations
Row permut. of local reord.
Reordering steps
0
2
4
6
8
10
12
14
0
5
10
15
20
25
30
35