**Optimization**

**-subproblem:** Similar to process of solving the update rule of ,the iterative update formula of can be obtained as follows,

(1)

**-subproblem:** Similarly, by solving the subproblems of , we can get the iterative update rule of as follows,

(2)

**-subproblem:** We fixed ,,, and to solve the update rule. The objective function of is given as,

(3)

Assuming that  is the Lagrangian multiplier of constraint , and . After converting the Frobenius norms of matrices to their trace norms, is rewritten as:

(4)

Setting the derivative of to 0 with respect to leads to formula (5) as,

(5)

According to the KTT condition , we derive,

(6)

The update rule of is obtained by coordinate gradient descent algorithm as follows,

. (7)

Similarly, we can calculate the iterative update formulas of and as follows,

(8)

. (9)