# Appendix A: Derivation of Equation (6)

For , recall by definition, we have

  (A1)

We define “#” as element-wise matrix multiplication operation, which means if a  matrix is multiplied by another  matrix, the elements in the first matrix is multiplied by the corresponding elements in the second matrix, and we define “/” as the element-wise matrix division operation. We have the following formula from Eq.(A1) as:

  (A2)

where , and .

Substituting for Eq.(A2) in the third term of Eq.(5) and  can be further decomposed into two components:

  (A3)

# Appendix B: Derivation of Equation (7)

For , as we defined in the previous statement , can be rewritten as:

  (B1)

Where , , , , ,

We apply Eq.(B1) into the fourth term of Eq.(5), we can have the further decomposition of  as:

  (B2)

Where  is the  diagonal matrix with all diagonal elements equal to , and  is similar to .

# Appendix C: Derivation of Equation (12)

For , the change of local Ghosh inverse matrix  can be rewritten as the following formula according to its definition:

  (C1)

We substitute  for  (where , ) in Eq.(C1) and apply it into the third term of eq.(11), and then we have:

  (C2)

# Appendix D: Derivation of Equation (13)

For , we rearrange the formula of , and we have:

  (D1)

Where ，，，

Applying Eq.(D1) into the fourth term of Eq.(11), we have:

  (D2)