

P_j P_i

$$m_1^{i,j} = \left(\text{acom}_1^{i,j}, \text{p}_1^{i,j}, \text{fs}_1^{i,j}, \hat{R}_i, \alpha_i \right)$$



$$m_1^{j,i} = \left(\text{acom}_1^{j,i}, \text{p}_1^{j,i}, \text{fs}_1^{j,i}, \hat{R}_j, \alpha_j \right)$$



$$m_2^{i,j} = \left(\text{acom}_2^{j,i}, \text{p}_2^{j,i}, \text{fs}_2^{j,i}, \text{bcom}_1^{i,j}, \text{pk}_i \right)$$



$$m_2^{j,i} = \left(\text{acom}_2^{i,j}, \text{p}_2^{i,j}, \text{fs}_2^{i,j}, \text{bcom}_1^{j,i}, \text{pk}_j \right)$$



$$m_3^{i,j} = \left(c_i, \text{p}_3^{i,j}, \text{fs}_3^{i,j}, \text{bcom}_2^{j,i} \right)$$



$$m_3^{j,i} = \left(c_j, \text{p}_3^{j,i}, \text{fs}_3^{j,i}, \text{bcom}_2^{i,j} \right)$$



$$m_4^{i,j} = \left(ev_i, \text{fs}_4^{j,i} \right)$$



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