Initial Conditions:

A) For Algo 2 from Ali Sayed Paper.

$$\hat{x}_{k,0|-1} = Ex_0 \quad \text{(i)}$$

$$P_{k,0|-1} = \pi_0 \quad \text{(ii)}$$

$$P^{-1}_{k,i|i-1} < ---- L - Banded\ inv(\ P_{k,i|i-1}) \quad \text{(iii)}$$

B) For DICI OR Algorithm from Usman Khan Paper

a) For $P_{k,i|i}$ from $P^{-1}_{k,i|i}$

$$Q^{(l)}_{\gamma} = (1-\gamma)I^{(l)}_{nxn} + \gamma\left(M^{(l)}\right)^{-1}(M^{(l)} - P^{-1}_{k,i|i}) \quad \text{(ii)}$$

$$P^{(l)}_{k,i|i} = P^{(l)}_{k,i-1|i-1} \quad \text{(iii)}$$

b) For $\hat{x}_{k,i|i}$ from $\hat{z}_{k,i|i}$

$$R^{(l)}_{\gamma} = [(1-\gamma)I^{(l)}_{nxn} + \gamma\left(M^{(l)}\right)^{-1}\left(M^{(l)} - P^{-1}_{k,i|i}\right)]\ \hat{x}^{(l)}{}_{k,i|i} \quad \text{(iv)}$$

$$\hat{x}^{(l)}{}_{k,i|i} = \hat{x}^{(l)}{}_{k,i-1|i-1} \quad \text{(v)}$$

Algorithm to be implemented:

Step 1: Measurement (incremental) update:

$$\widehat{H}_{k,l,i} = \bar{H}_{l,i}(\hat{x}_{k,i|i-1}) \quad 1$$

$$P^{-1}_{k,i|i} = P^{-1}_{k,i|i-1} + \sum_{l\in N_k} \widehat{H}^{*}{}_{k,l,i}\, R^{-1}_{l,i} \widehat{H}_{k,l,i} \quad 2$$

$$\hat{z}_{k,i|i} = \hat{z}_{k,i|i-1} + \sum_{l\in N_k} \widehat{H}^{*}{}_{k,l,i}\, R^{-1}_{l,i} y_{l,i} \quad 3$$

Step 2: DICI-OR Algorithm

a) For $P_{k,i|i}$ from $P^{-1}_{k,i|i}$

$$p_{jk,i+1} = \begin{cases} q_j p^k_i & j \neq k \\ q_j p^k_i + \gamma m^{-1}_{jj} & j = k \qquad |j-k| \leq L \end{cases} \quad 4$$

$$p_{jk} = p_{j,k-1}.p^{-1}_{j+1,k-1}.p_{j+1,k} \quad 5$$

b) For $\hat{x}_{k,i|i}$ from $\hat{z}_{k,i|i}$

$$\hat{x}_{jk,i+1} = \begin{cases} R_{\gamma}^{(l)} & j \neq k \\ R_{\gamma}^{(l)} + \gamma m_{jj}^{-1} & j = k \qquad |j-k| \leq L \end{cases} \tag{6}$$

Step 3: Time Update

$$\hat{x}^{(l)}{}_{k,i+1|i} = \bar{F}_i\left(\hat{x}_{k,i|i}\right).\hat{x}_{k,i|i} + \bar{u}_{k,i}(\hat{x}_{k,i|i}) \tag{7}$$

$$P_{k,i+1|i} = \bar{F}_i\left(\hat{x}_{k,i|i}\right).P_{k,i|i}\bar{F}_i\left(\hat{x}_{k,i|i}\right)^* + G_i Q_i G_i^* \tag{8}$$

$$P_{k,i|i-1}^{-1} < ---- L - Banded\ inv(\ P_{k,i|i-1}) \tag{9}$$

Now repeat from Step 1 with new $\boldsymbol{P_{k,i|i-1}^{-1}}$
