Key Observations

- $\max_i \mathbf{e}_i^{-1} \lambda_i \equiv \mathbf{e}^{-1} (\sum_i \lambda_i)$
  - Define $\lambda_i = x_i^p = (\sum_{j \in [s]} x_i(j))^p$

- median$(\mathbf{e}^{-1} \cdot \sum_i x_i^p) = \sum_i x_i^p / (\ln 2)$

- Can we compute $i^* = \text{argmax}_i \, \mathbf{e}_i^{-1} \cdot x_i^p$ in one round?
  - Can then compute $\mathbf{e}_{i^*}^{-1} x_{i^*}^p = \mathbf{e}_{i^*}^{-1} \left(\sum_j x_{i^*}(j) \right)^p$ in the second round

- Useful property:
  - $\sum_i \mathbf{e}_i^{-1}\lambda_i \leq O(\log^2 n) \max_i \mathbf{e}_i^{-1}\lambda_i$ -- the largest value is significant

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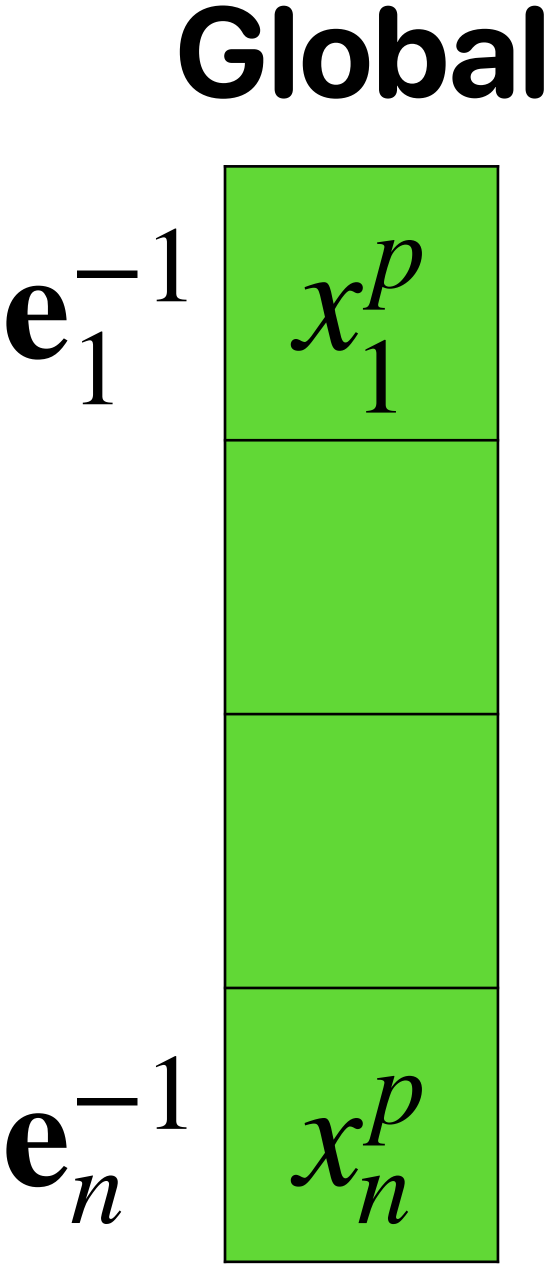
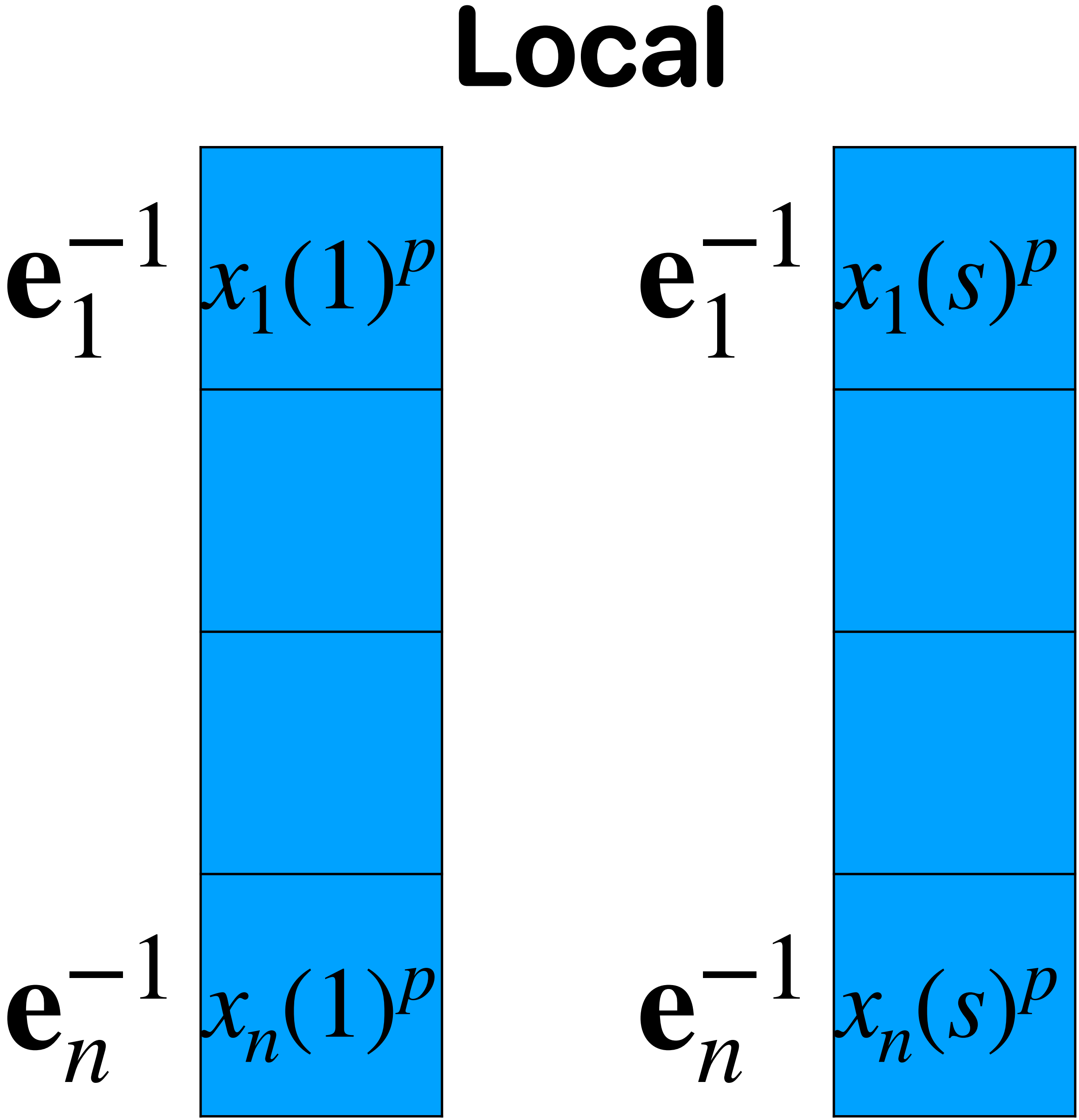
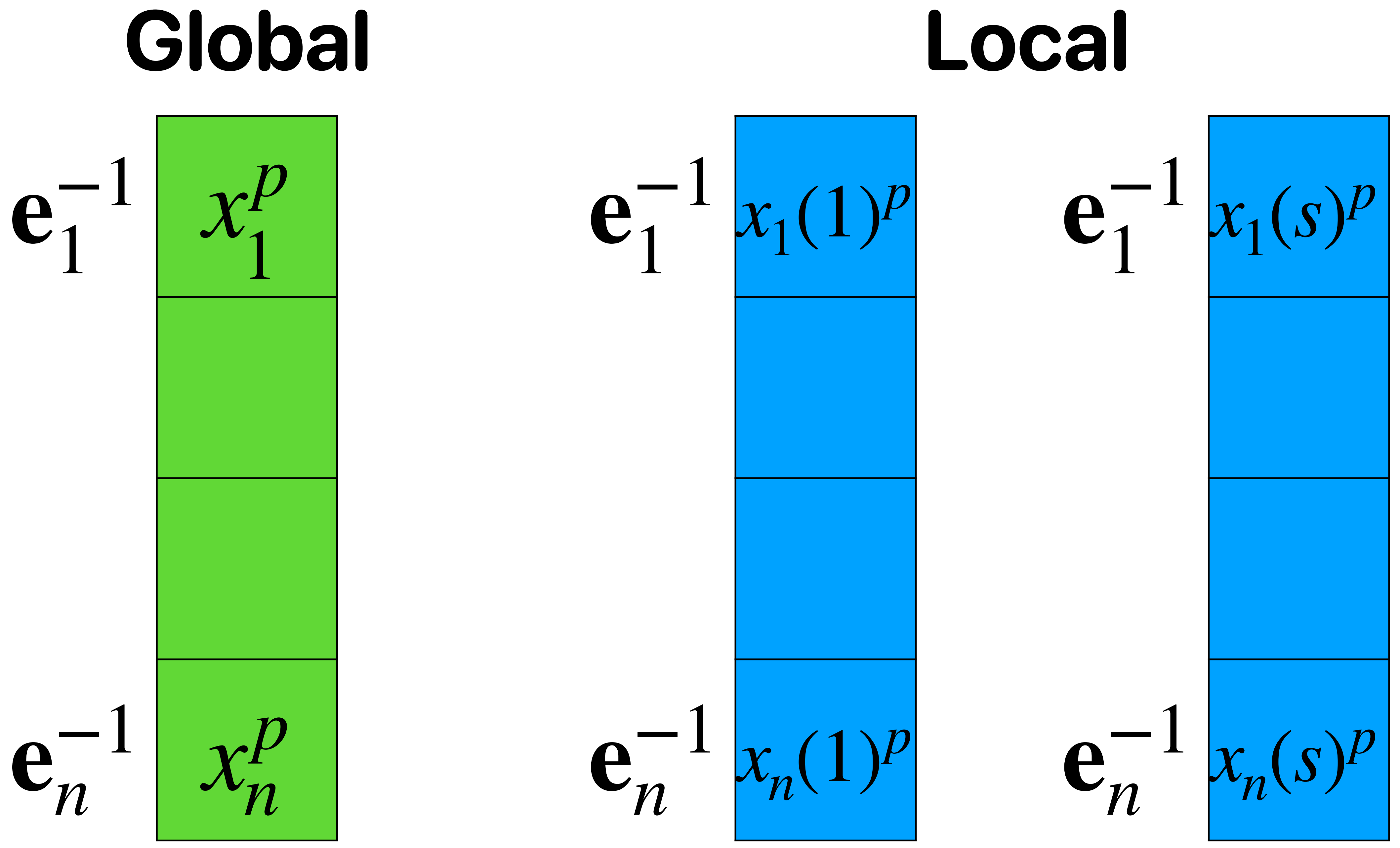

Global
$\mathbf{e}_1^{-1}$
x_1^p
$\mathbf{e}_n^{-1}$
x_n^p



Local
$\mathbf{e}_1^{-1}$
$x_1(1)^p$
$\mathbf{e}_n^{-1}$
$x_n(1)^p$
$\mathbf{e}_1^{-1}$
$x_1(s)^p$
$\mathbf{e}_n^{-1}$
$x_n(s)^p$

Key Observations



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High Level Ideas