

Deterministic Algorithm

- Stack $S_1^{(1)}, \dots, S_t^{(1)}$ to get a matrix $Q^{(1)}$

$$r^{(1)} = \frac{\alpha}{\sqrt{n}} \begin{matrix} \text{blue box} & Q^{(1)} \end{matrix} \begin{matrix} \text{red box} \\ u \otimes v \end{matrix} + \begin{matrix} \text{blue box} & Q^{(1)} \end{matrix} \begin{matrix} \text{red box} \\ \text{vec}(G) \end{matrix}$$

- Based on $r^{(1)}$ pick $Q^{(2)}[r^{(1)}]$

Bayes Risk Lower Bounds

- Is $r^{(1)}$ enough to pick good $Q^{(2)}$?
- Bayes risk lower bounds:
 - Framework used by Simchowitz, El Aloui, Recht '18 to obtain matrix-vector lower bounds for a related problem
- Θ be a parameter space and $\{\mathcal{P}_\theta : \theta \in \Theta\}$ be a set of distributions
- Suppose $\theta \sim w$ and $x \sim \mathcal{P}_\theta$ and x is given to us
 - Bayes risk lower bounds show how much we can say about θ