

Solving Issues of Negative Entries

• Consider $Q'' = (Q')^{\otimes 2}$ and $K'' = (K')^{\otimes 2}$

• Q', K' are sketches for $p/2$

- All entries of $Q' \cdot (K')^T$ are non-negative!

- One of our **technical contributions** is that if Q' and K' have AMM property for degree $p/2$, then Q'' and K'' have AMM property for degree p

$$\bullet \left\| Q'^{\prime\prime} \cdot (K'^{\prime\prime})^{\top} - Q^{\otimes p} (K^{\otimes p})^{\top} \right\|_F \text{ is small}$$

• Just compute $LT(Q'' \cdot (K'')^T) \cdot V$

• The model converges

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- One of our **technical contributions** is that if Q' and K' have AMM property for degree $p/2$, then Q'' and K'' have AMM property for degree p
 - $\|Q'' \cdot (K'')^T - Q^{\otimes p} (K^{\otimes p})^T\|_F$ is small
- Just compute $\text{LT}(Q'' \cdot (K'')^T) \cdot V$
- The model converges

Our Final Sketch

