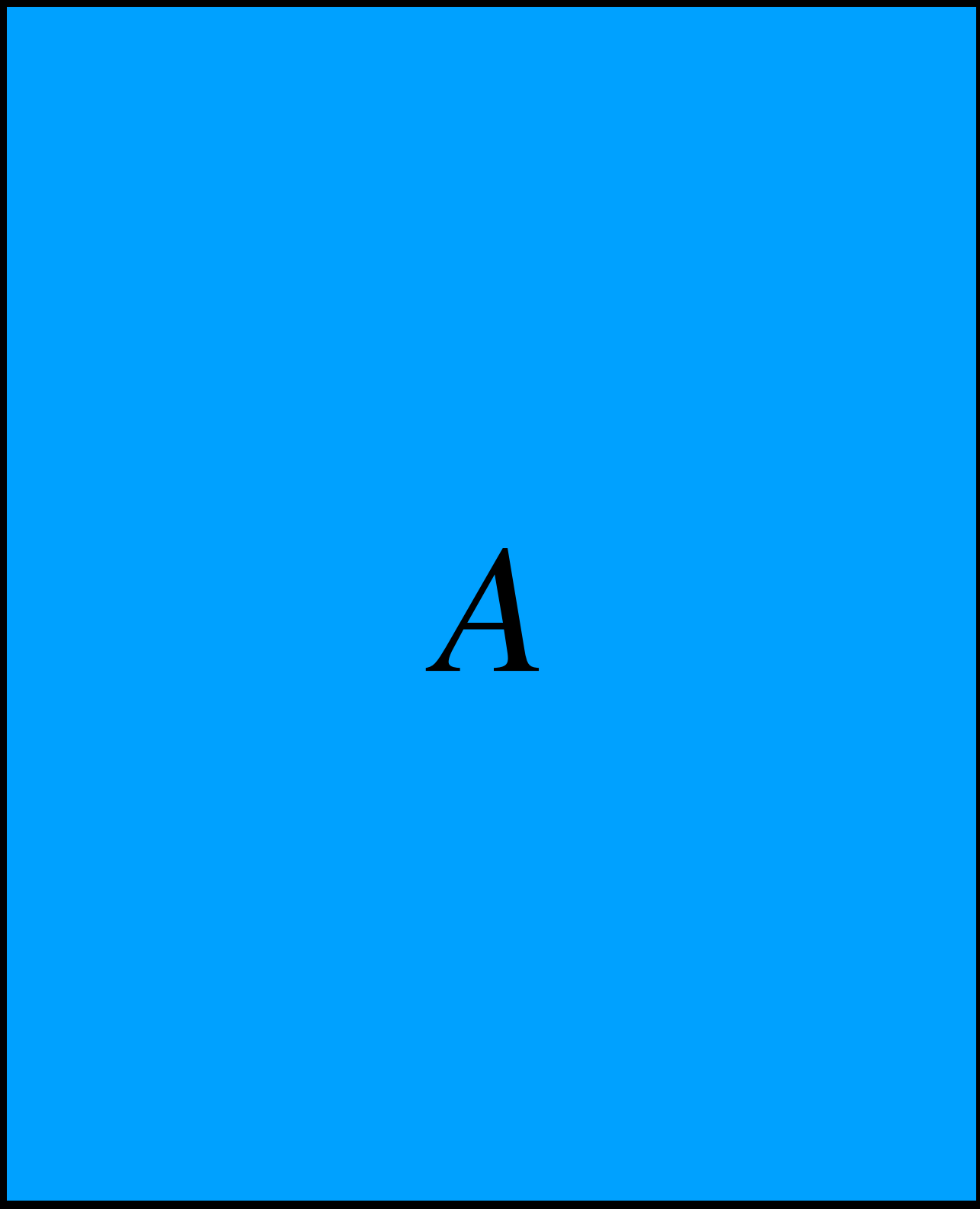
Query Complexity

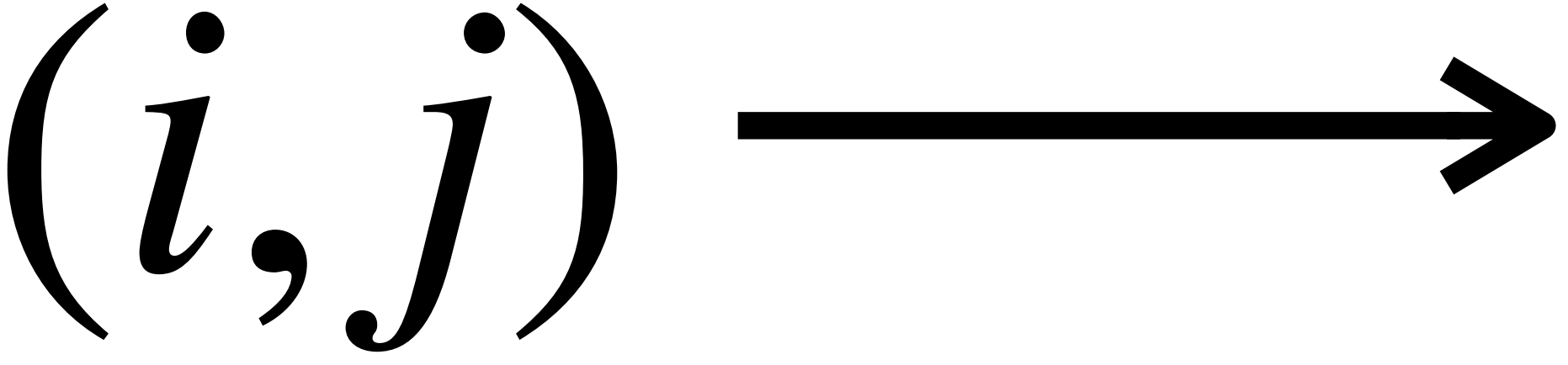
- Access to dataset maybe restricted for efficiency:

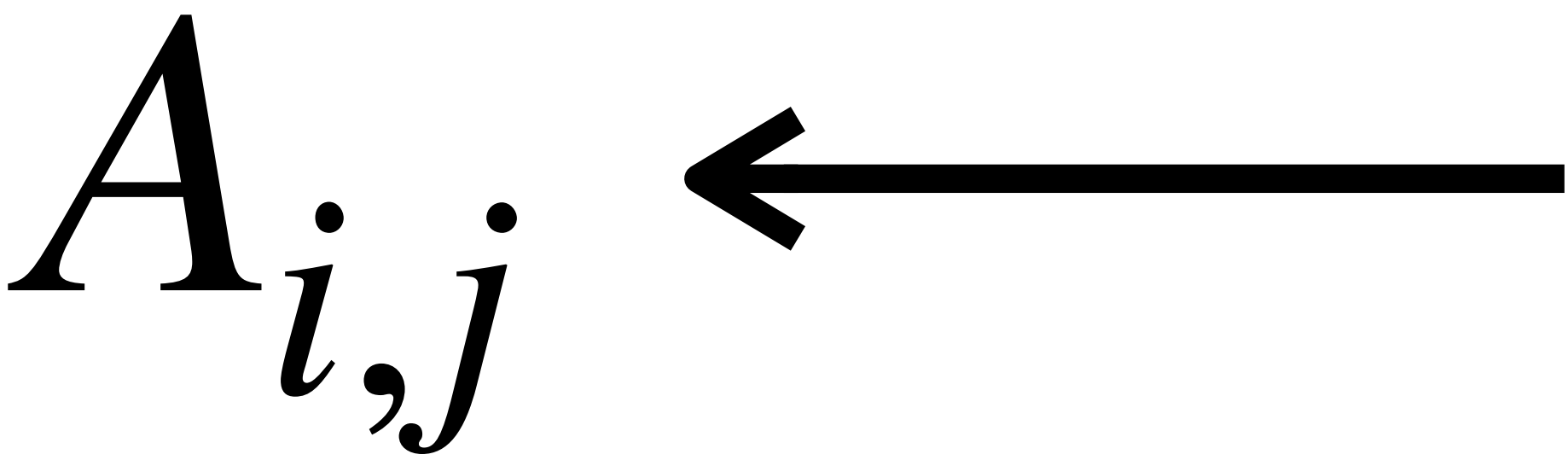
- Query arbitrary entries

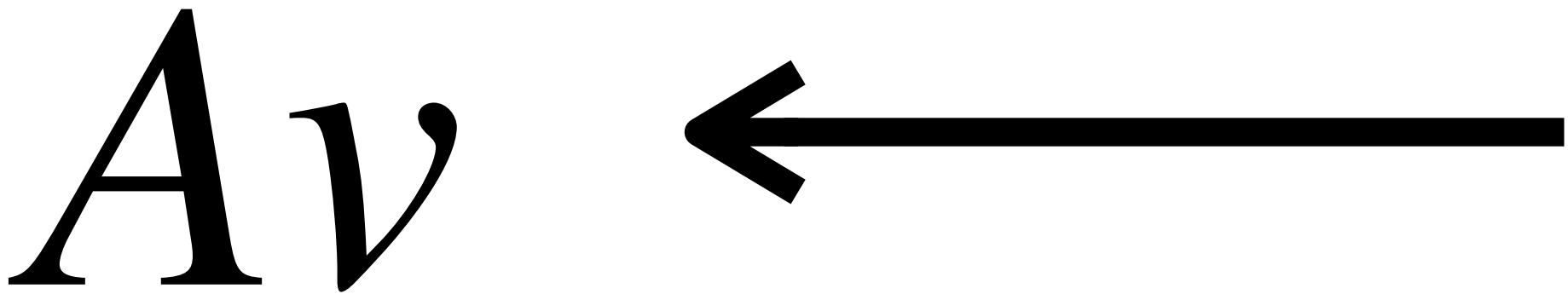
- Query matrix-vector products

- Query arbitrary *linear measurements*

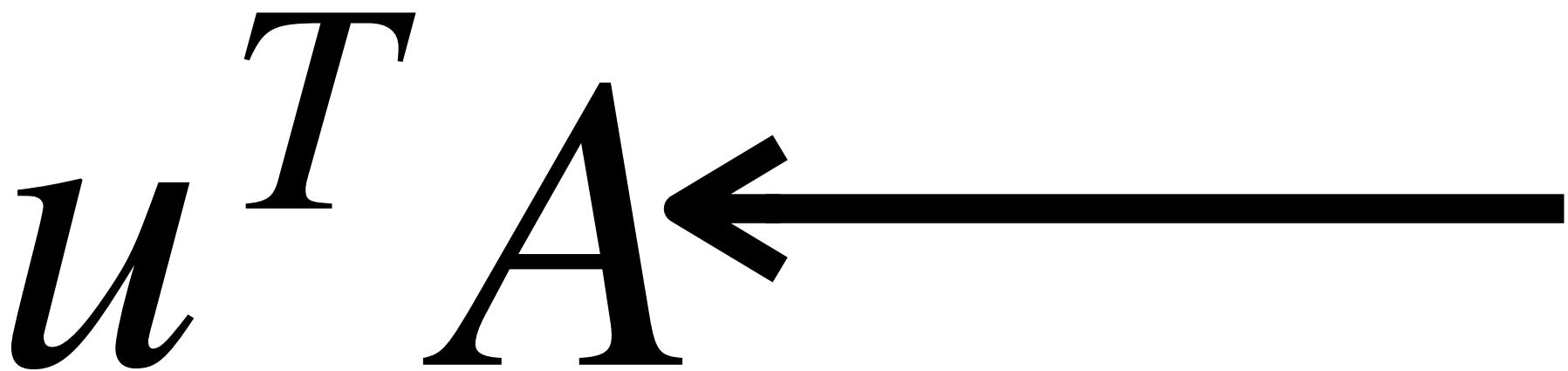

A


(i, j)

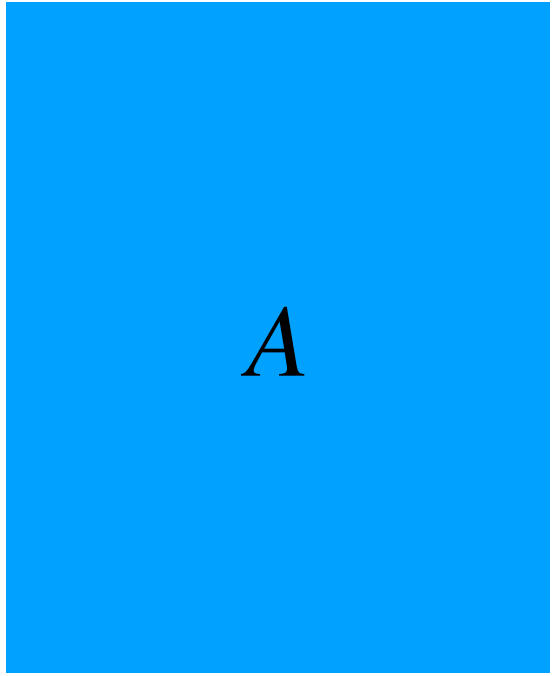
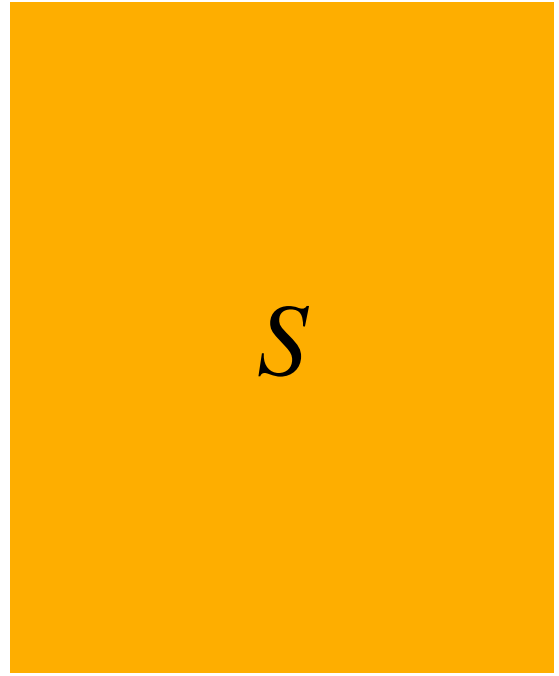

$A_{i,j}$


Av


u


$u^T A$

$$= \sum_{i,j} S_{i,j} A_{i,j} = \langle \mathrm{vec}(S), \mathrm{vec}(A) \rangle$$

Measure  with 

- How many queries do we need to solve a problem?

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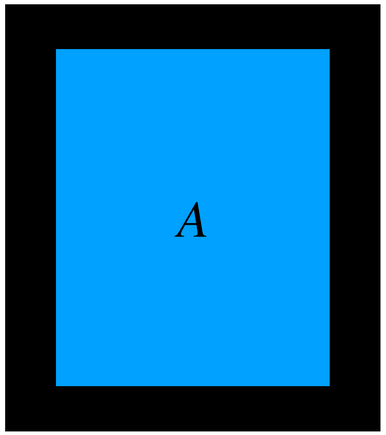
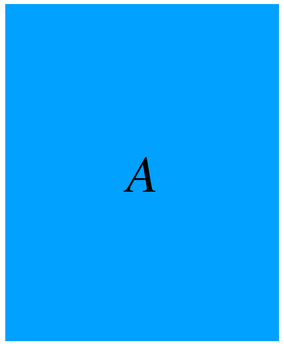
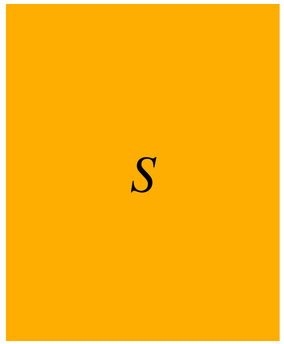


Measure  with 

$$= \sum_{i,j} S_{i,j} A_{i,j} = \langle \text{vec}(S), \text{vec}(A) \rangle$$

- How many queries do we need to solve a problem?

Space Complexity

- Streaming:
    - Space required by an algorithm to maintain the state while processing the stream