Point Location

Performance Of Trapezoidal Map

- Number Of Trapezoids Created (1)

06-J-04

Junhui DENG

deng@tsinghua.edu.cn

- Claim: $E[k(i)] = O(1)$

  where the expectation is taken over all **permutations** of S

- Again, we will use the **backward analysis** technique ...

- Now, consider the moment **right after** s_i has just been inserted

- Observation: Each segment in S_i

  has an **equal probability** of

  being the **last one** to have been inserted

❖ Now, given a trapezoid Δ and a segment s, let

- $\delta(\Delta, s) = 1$ if s would have caused Δ to be created, had s been inserted last
- $\delta(\Delta, s) = 0$ otherwise

❖ Therefore we have

E[k(i)]

$= (1/i) \times \sum_{s \in S_i} \sum_{\Delta \in TM_i} \delta(\Delta, s)$ //averaging # trapezoids created by each s

$= (1/i) \times \sum_{\Delta \in TM_i} \sum_{s \in S_i} \delta(\Delta, s)$ //interchanging the order of summation