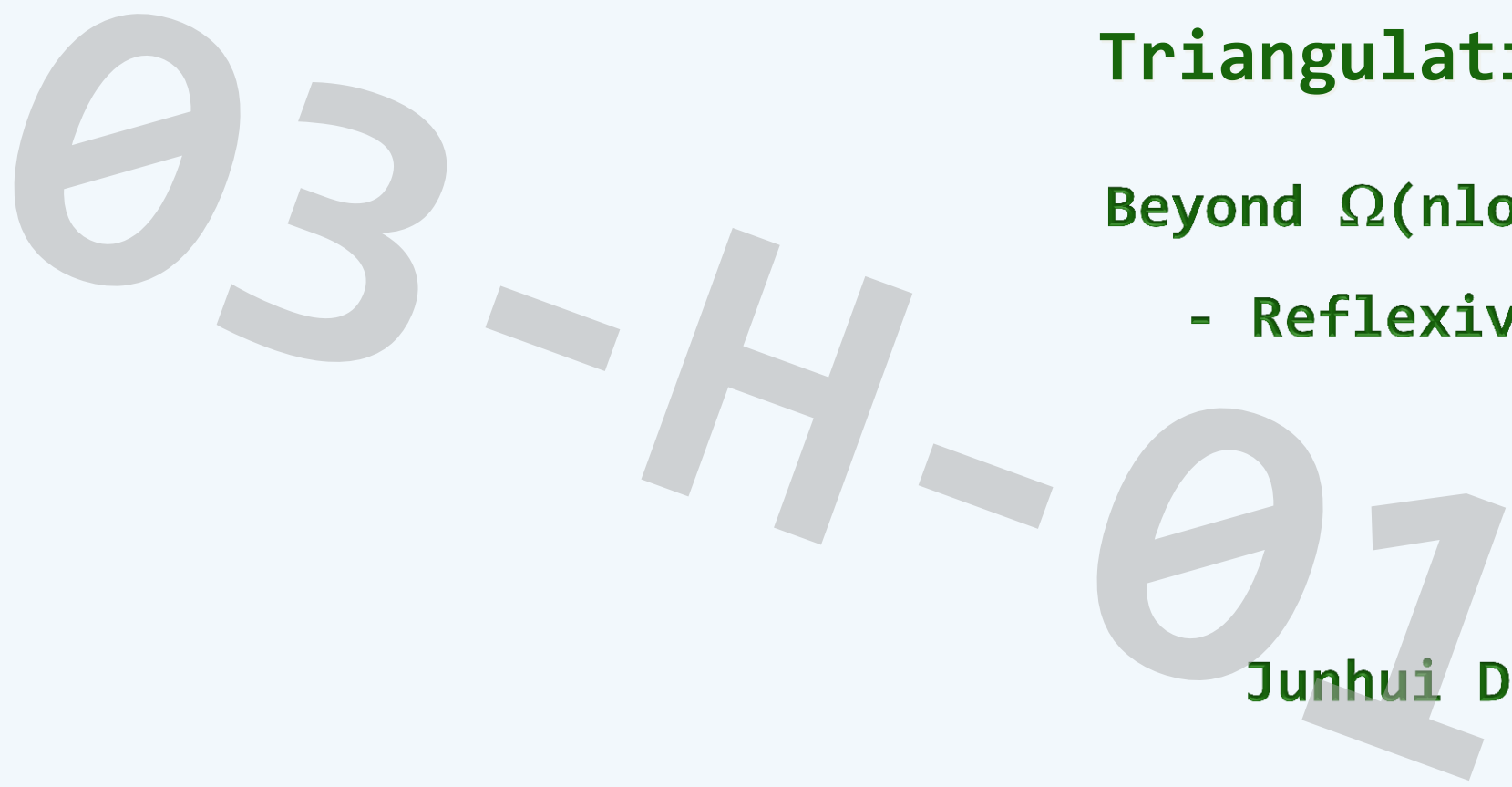

Triangulation

Beyond Ω(nlogn)

- Reflexivity

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Ω(nlogn) ?

- For a long period, people conjectured that ...

  Ω(nlogn) is a lower bound for simple polygon triangulation

- Most people believed that it is true, though nobody could prove it

- The hints for the existence of beyond-Ω(nlogn) algorithms

  came from the fact that

  there are algorithms with performances

  sensitive to the polygon shapes

- Examples include the number of reflex vertices, the sinuosity, ...

Hertel & Mehlhorn, 1983

❖ A simple polygon can be triangulated in $O(n + r\log r)$ time,

after a single pass of plane sweeping,

where r is the number of reflex vertices

❖ They refined the plane sweep paradigm s.t.

- The sweep line stops only at the r reflex vertices;

//Thus only $O(r)$, in stead of $O(n)$, vertices need to be sorted

- The sweep line may break into pieces,

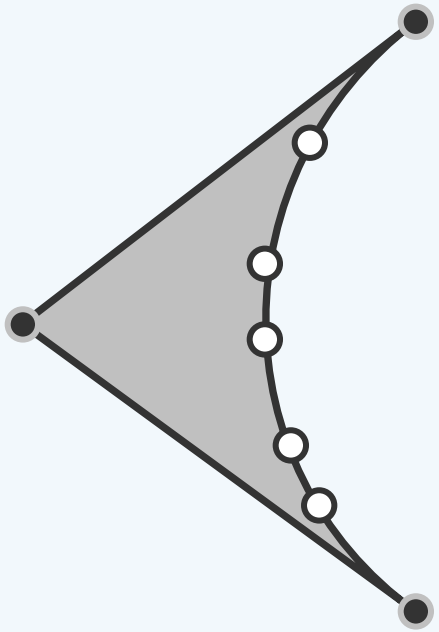
some of which may lag behind others

Reflexivity Sensitivity

- It should be pointed out that,

  since an n-gon may have up to $r = n - 3$ reflex vertices

  this does not beat $\Omega(n \log n)$ in the worst cases



- Nevertheless,

  it could be a significant gain in practice

- Moreover, it was the first hint that

  perhaps an $o(n \log n)$ algorithms might be achievable