03-H-02

Triangulation

Beyond Ω(nlogn)

- Sinuosity

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Horizontal Crossing

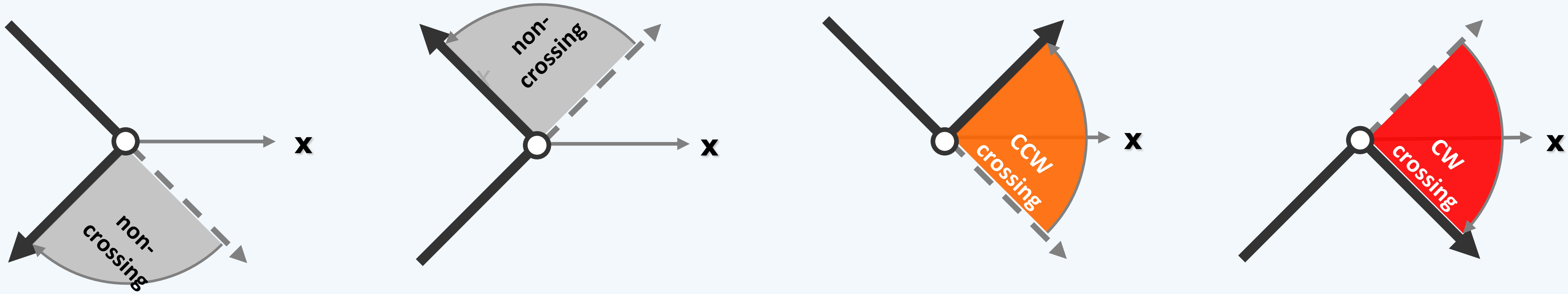
❖ Let C be a polygonal chain with m crossings $\boxed{c_0, \ldots, c_{m-1}}$

1. C is called a **spiraling** chain

   if there is no i, $0 \le i < m$, such that c_i and c_{i+1} are both **CW** crossings

2. C is called an **anti-spiraling** chain

   if there is no i, $0 \le i < m$, such that c_i and c_{i+1} are both **CCW** crossings

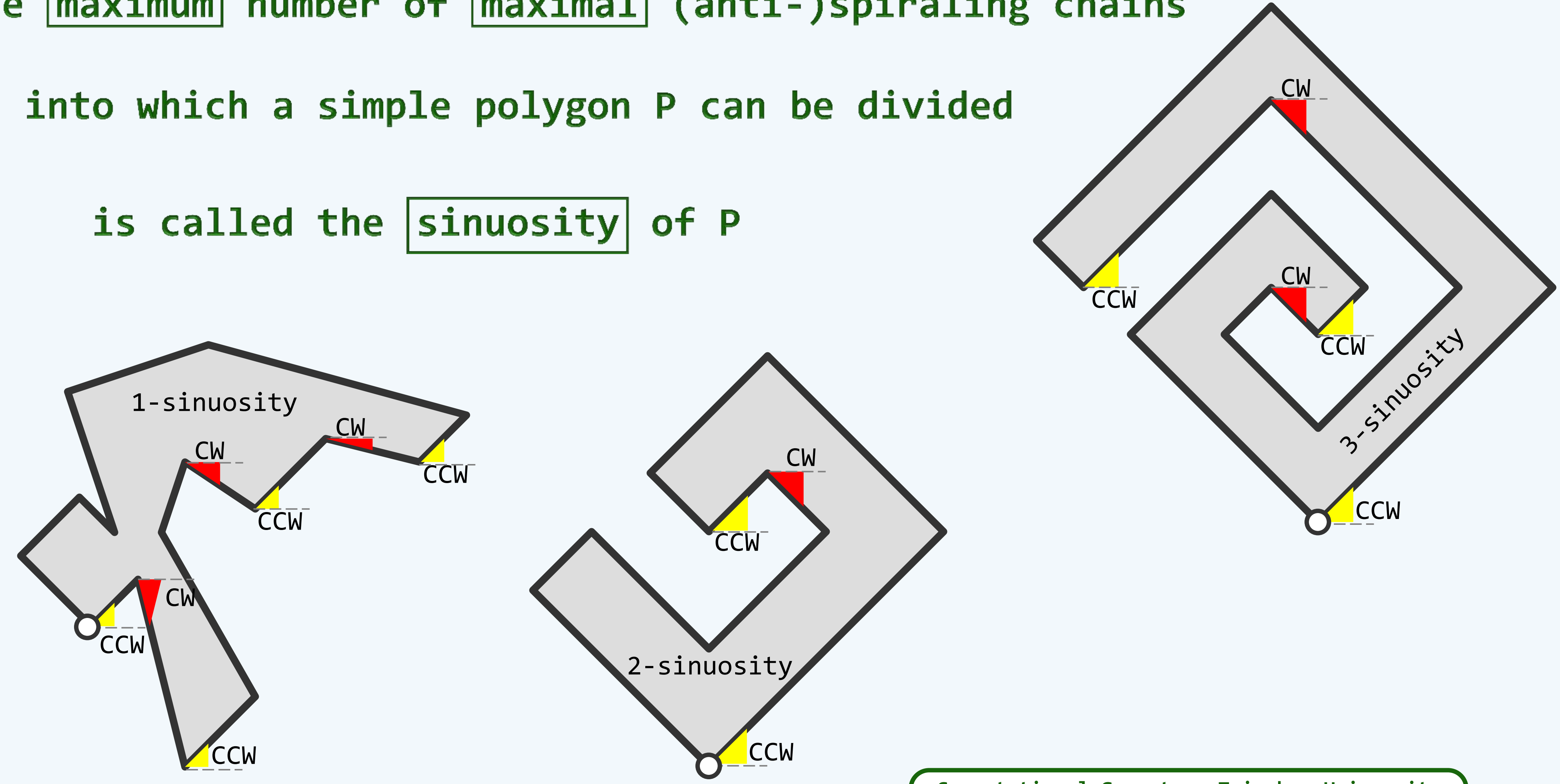


Sinuosity

❖ The $\boxed{\text{maximum}}$ number of $\boxed{\text{maximal}}$ (anti-)spiraling chains

into which a simple polygon P can be divided

is called the $\boxed{\text{sinuosity}}$ of P

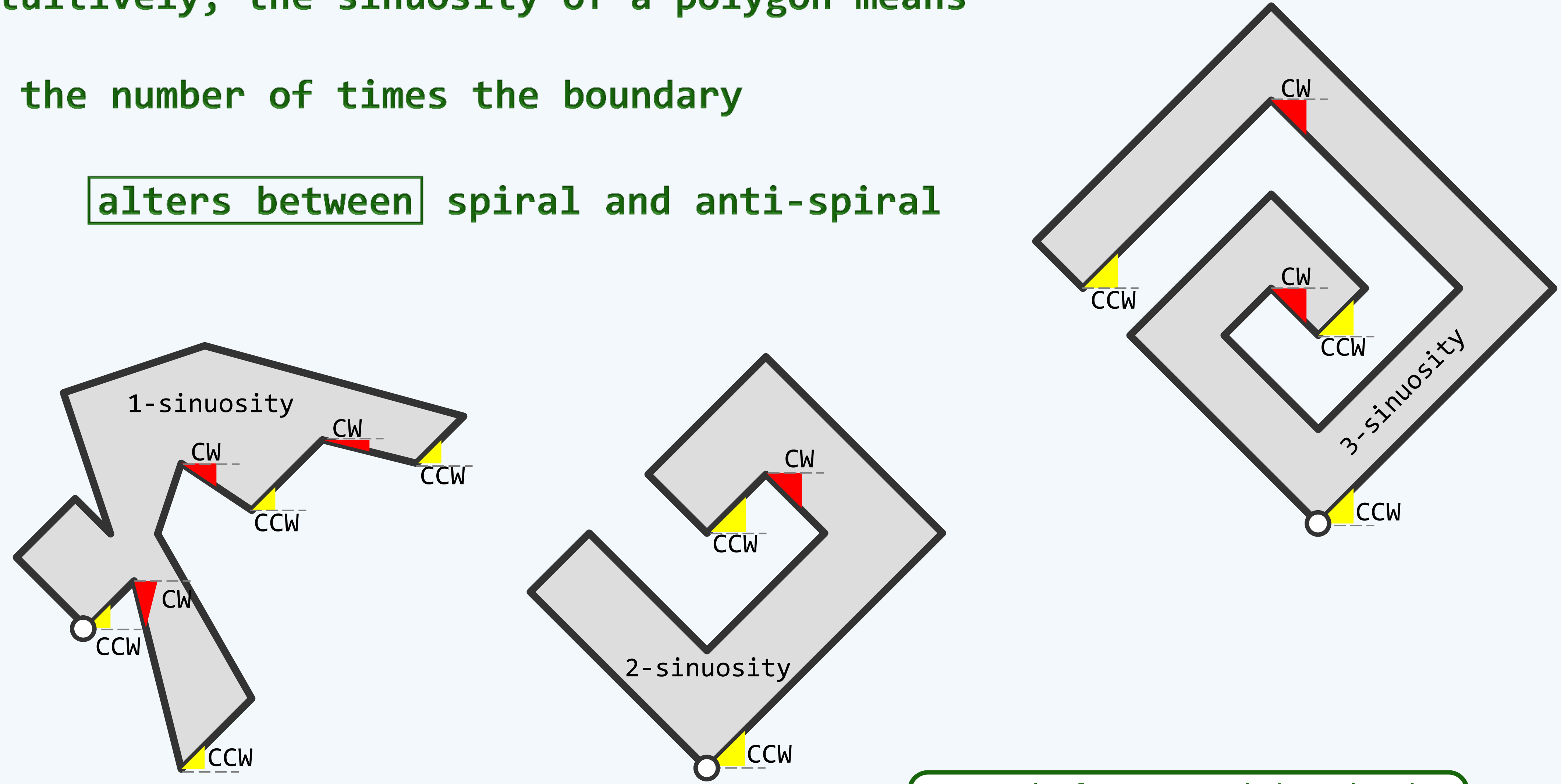


Sinuosity

❖ Intuitively, the sinuosity of a polygon means

the number of times the boundary

alters between spiral and anti-spiral



Chazelle & Incerpi, 1984

1) An (anti-)spiraling chain

   can be horizontally trapezoidalized in $\boxed{\text{linear}}$ time

2) A simple polygon P of sinuosity $\boxed{s}$

   can be triangulated in $\boxed{\mathcal{O}(n\log s)}$ time

❖ Note that, for general polygons, $\boxed{s \ll r}$

❖ But again, since $s = \boxed{\mathcal{O}(n)}$,

   there are no improvements in the worst cases