05-A-02

Delaunay Triangulation

Point Set Triangulation

- Edge Flipping

宝玉又翻转了一个更次，至五更方睡去时，只见晴雯从外头走来，仍是往日形景，进来笑向宝玉道：“你们好生过罢，我从此就别过了。”

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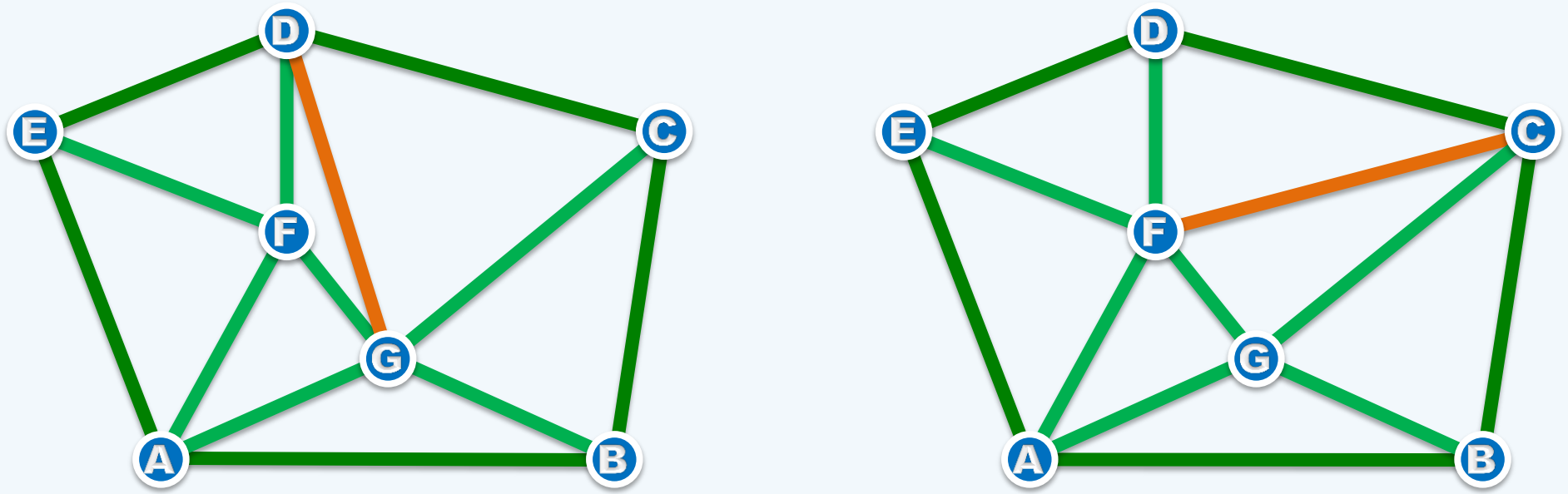
Non-uniqueness

❖ P might have many triangulations, each of which

uses $3(n-1) - h$ diagonals and consists of $2(n-1) - h$ triangles



❖ For example, each triangulation for a set P with $n = 7$ and $h = 5$ has

$3x7 - 5 - 3 = 13$ diagonals and consists of $2x7 - 5 - 2 = 7$ triangles

Number of Triangulations

❖ How many triangulations could a point set have?

❖ Each planar set of n points has no more than $O(59^n / n^6)$ triangulations

F.Santos, R.Seidel, //upper bound

A better upper bound on the number of triangulations of a planar point set.

J. Combin. Theory Ser. A, 102:186–193, 2003

❖ For any n >> 1, there exists a planar set of n points

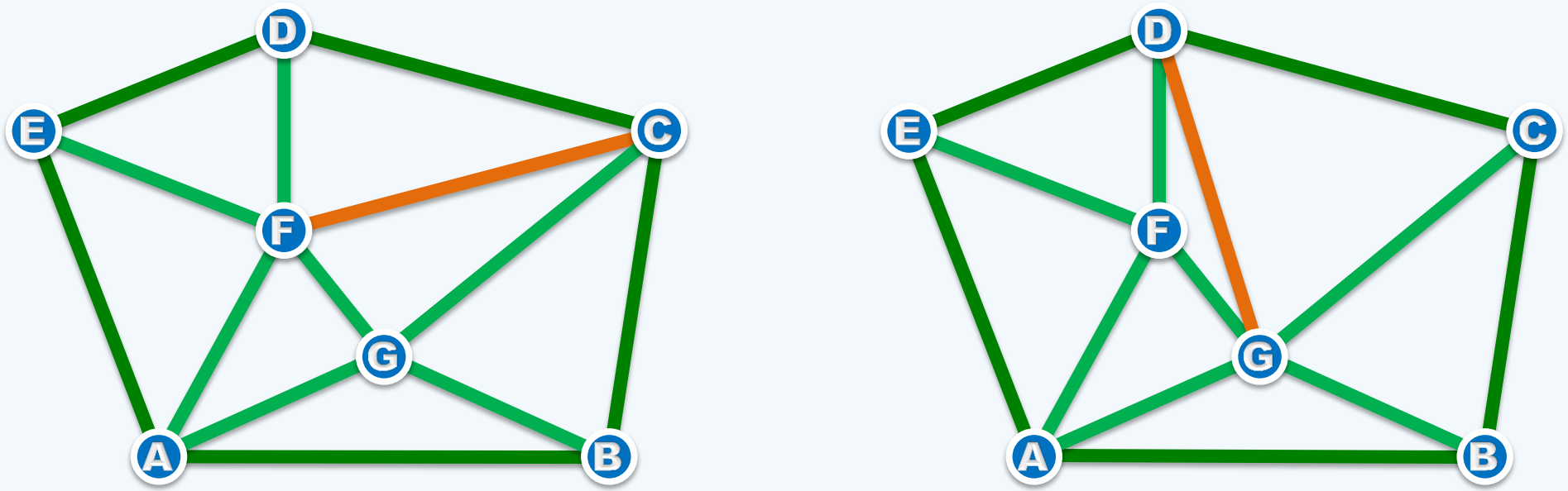
which has $\Omega(72^{n/2}) = \Omega(8.48528^n)$ triangulations

Oswin Aichholzer, et al. *On the number of plane graphs* //lower bound

Proc. 17th Ann. ACM-SIAM Symp. on Discrete Algorithms

Edge Flipping

❖ An edge flip transforms a triangulation into one another



❖ Edge flip is an important technique to get an "optimal" triangulation