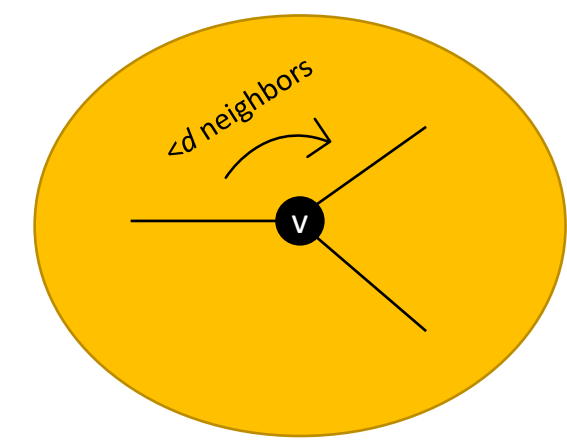


The Complexity of Testing all Properties of Planar Graphs, and the Role of Isomorphism

Sabyasachi Basu, Akash Kumar, C. Seshadhri

Property Testing in Sparse Graphs

G : graph on n vertices, degree bound: d .
Graph stored as adjacency list.



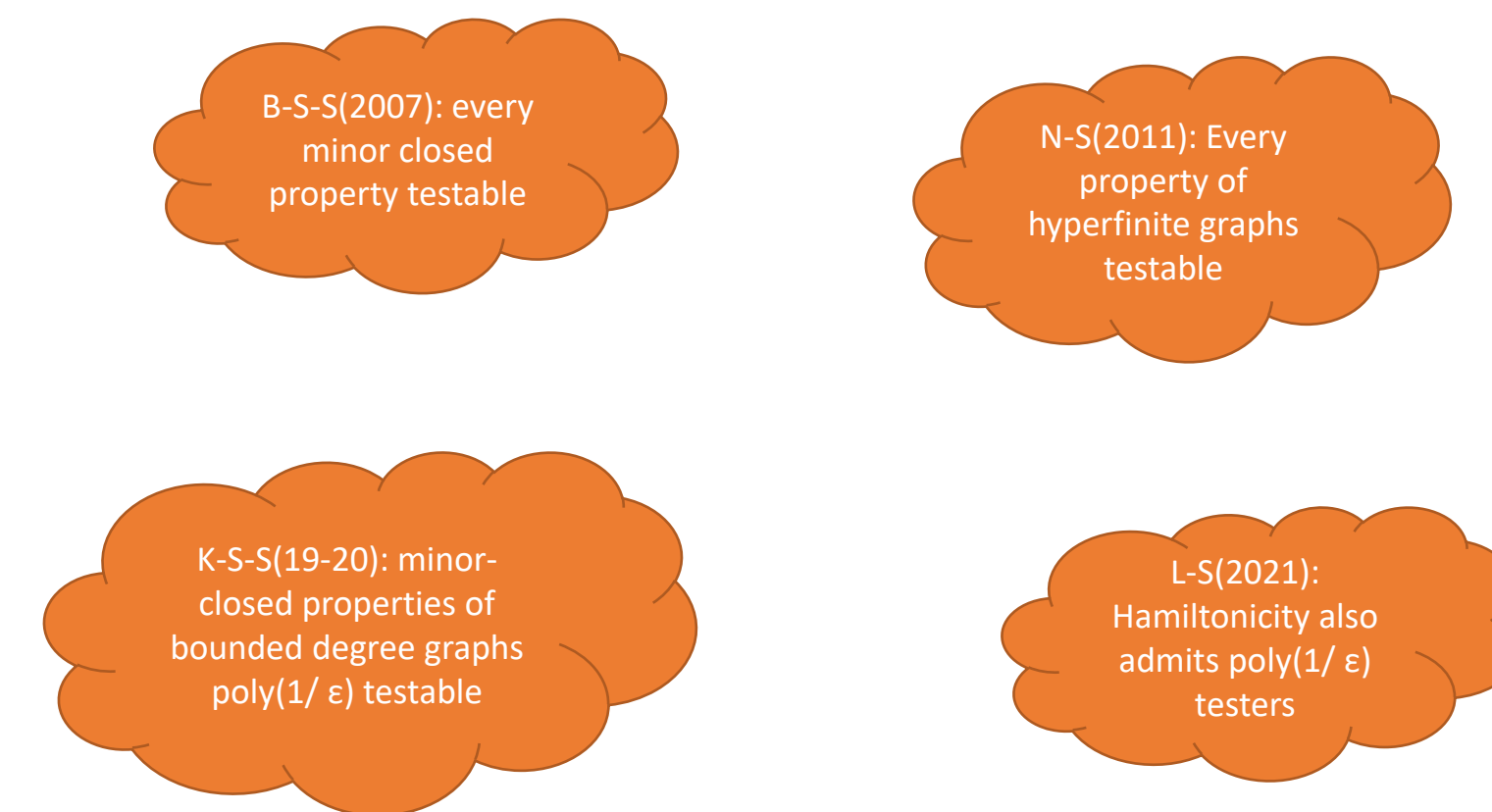
Vertex query: return a vertex v UAR

Neighborhood queries reveal the i -th neighbor for a particular vertex

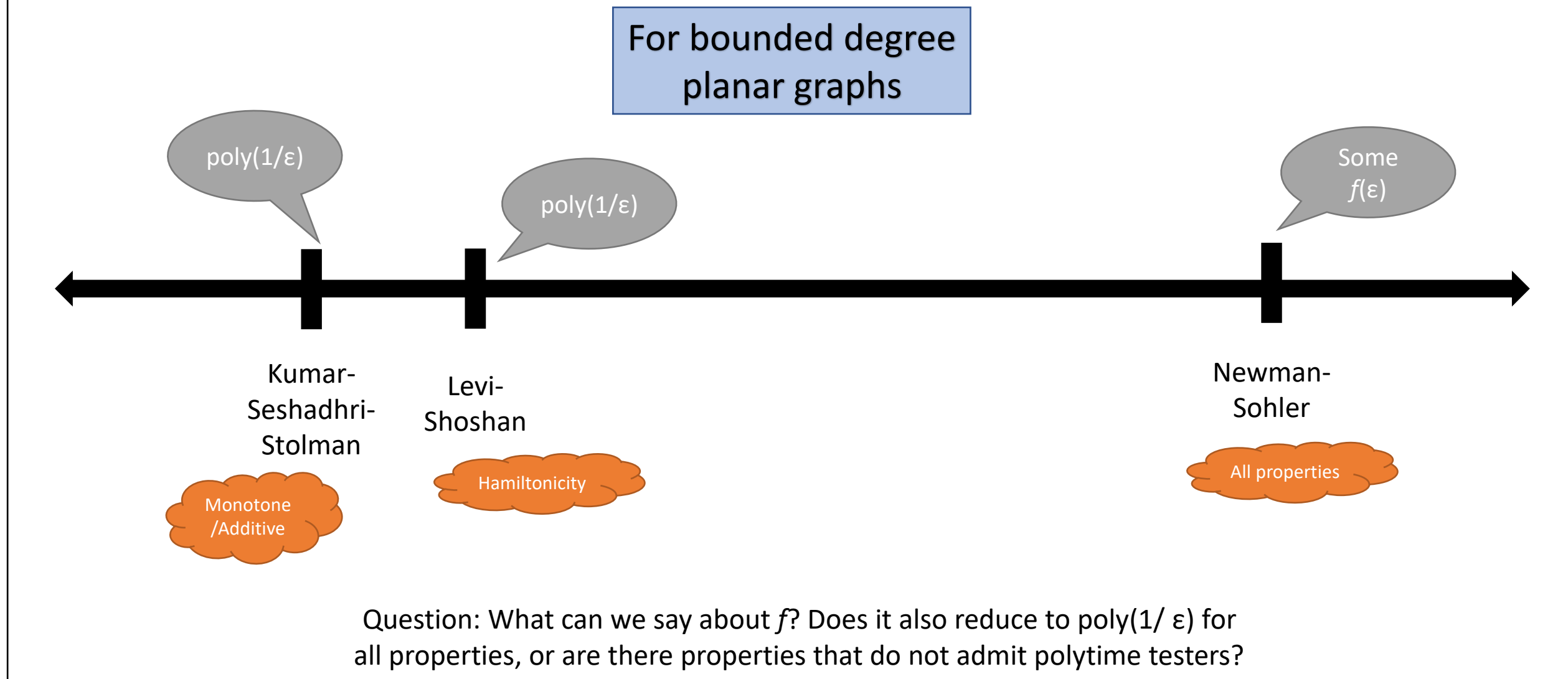
G : typically far from not having a property; Measure of fairness: ϵ

Testable: Properties whose query complexities can be bound by functions of ϵ

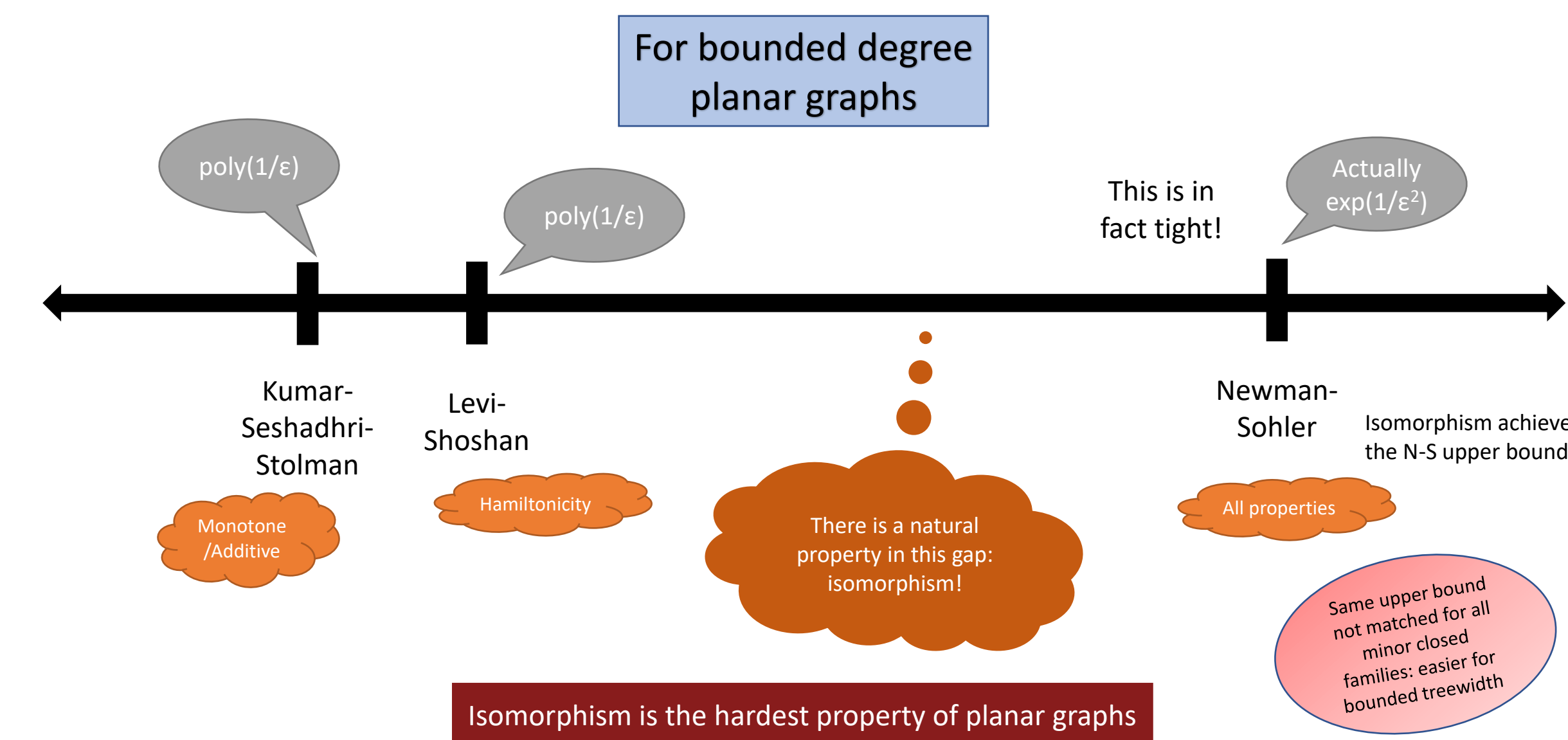
What We Know: Sparse Graphs



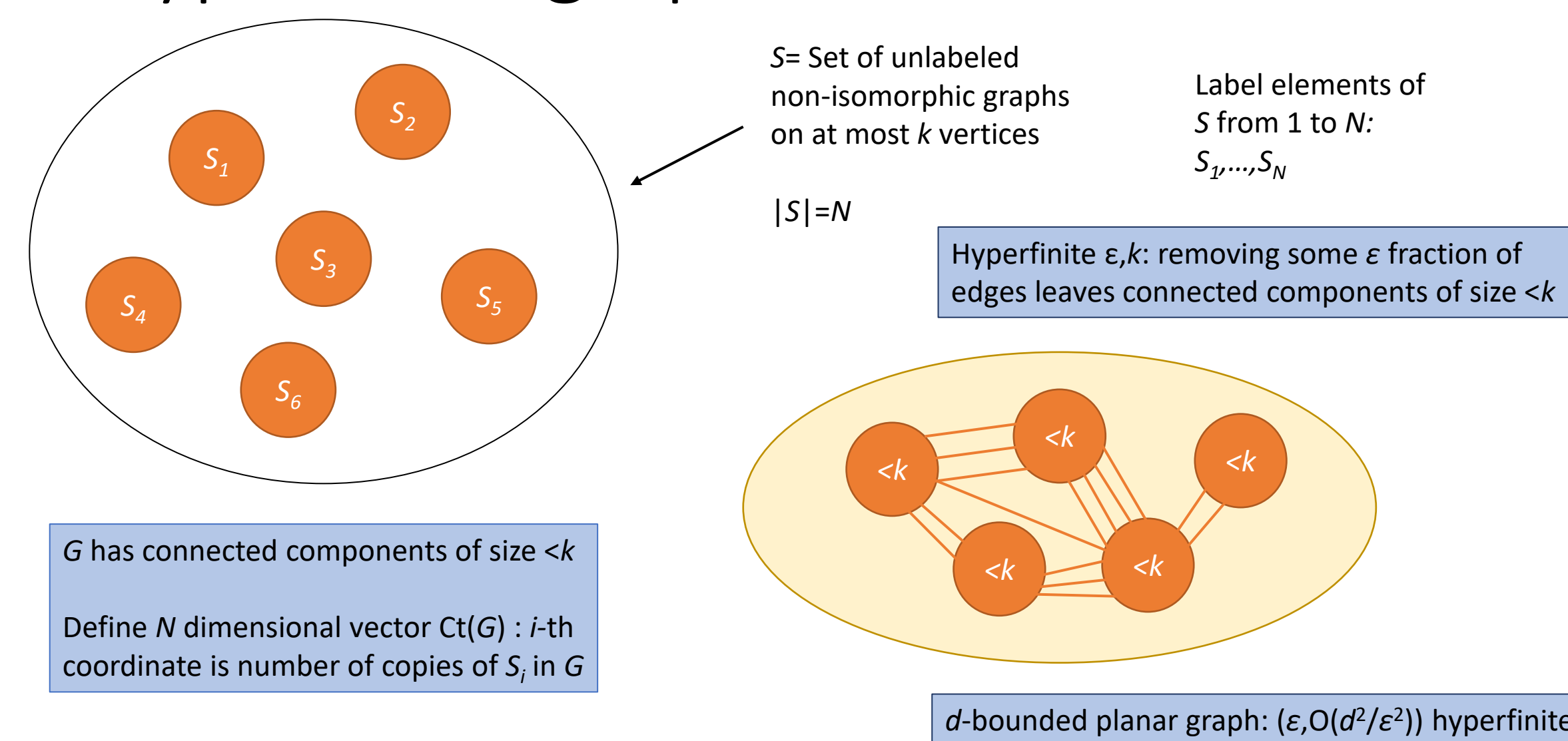
Where does the truth lie?



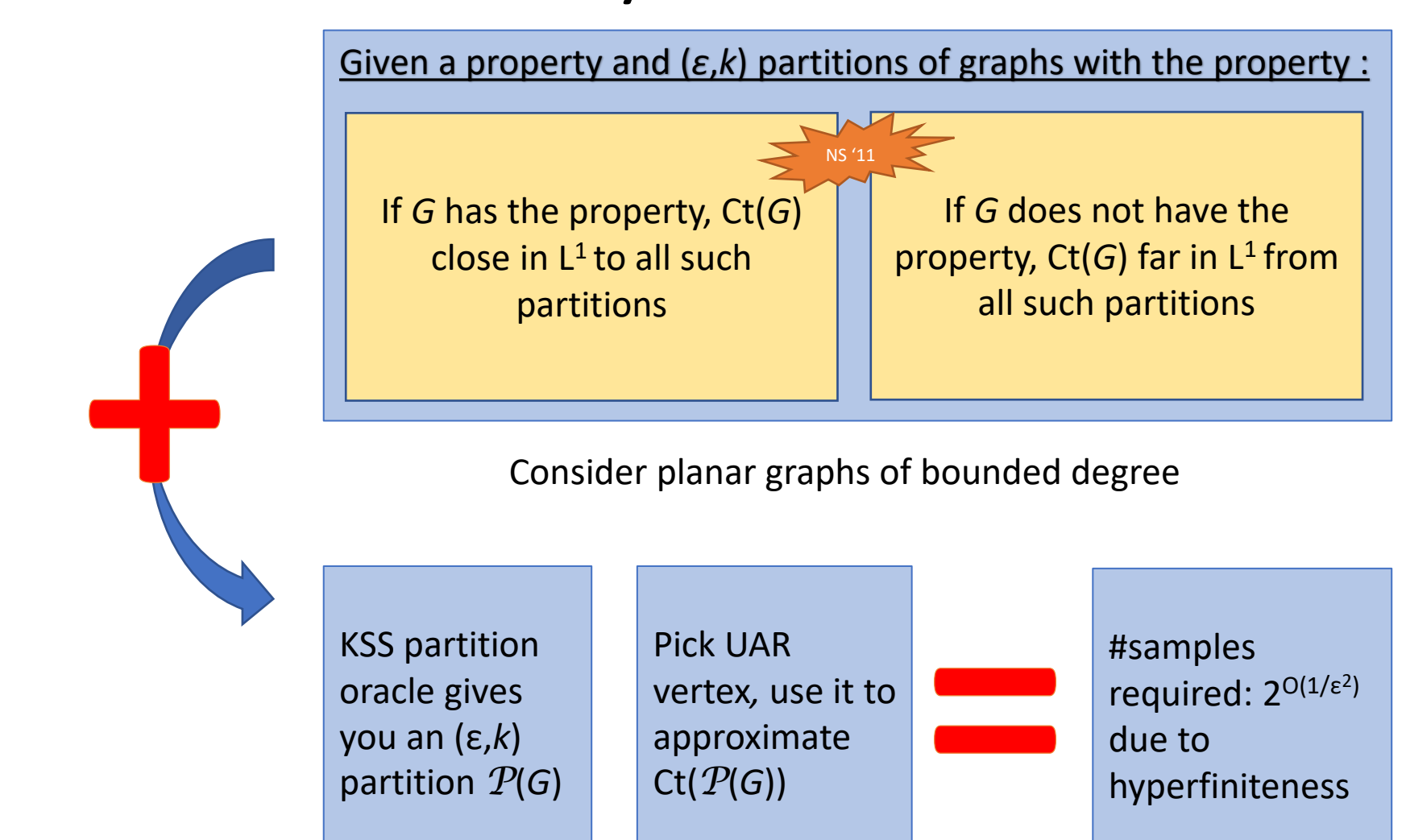
Our Contribution



Hyperfinite graphs and count vectors



Careful Analysis of Newman-Sohler

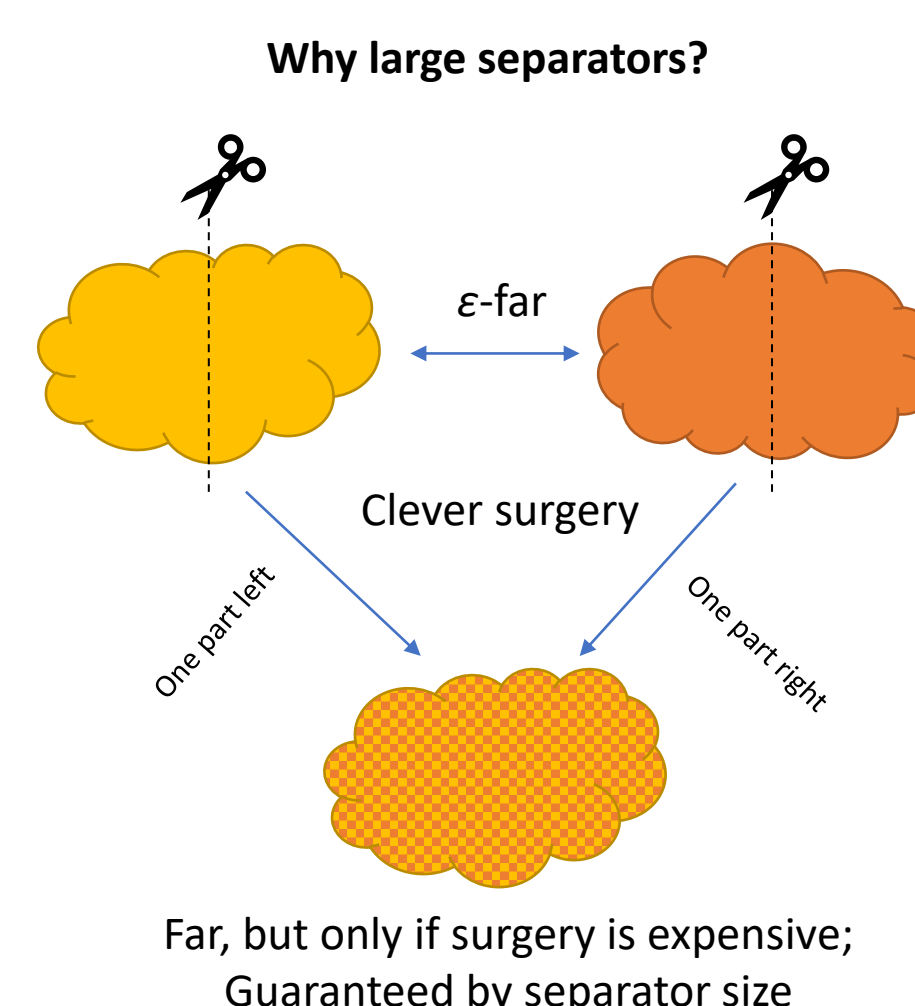


Towards the Isomorphism Lower Bound

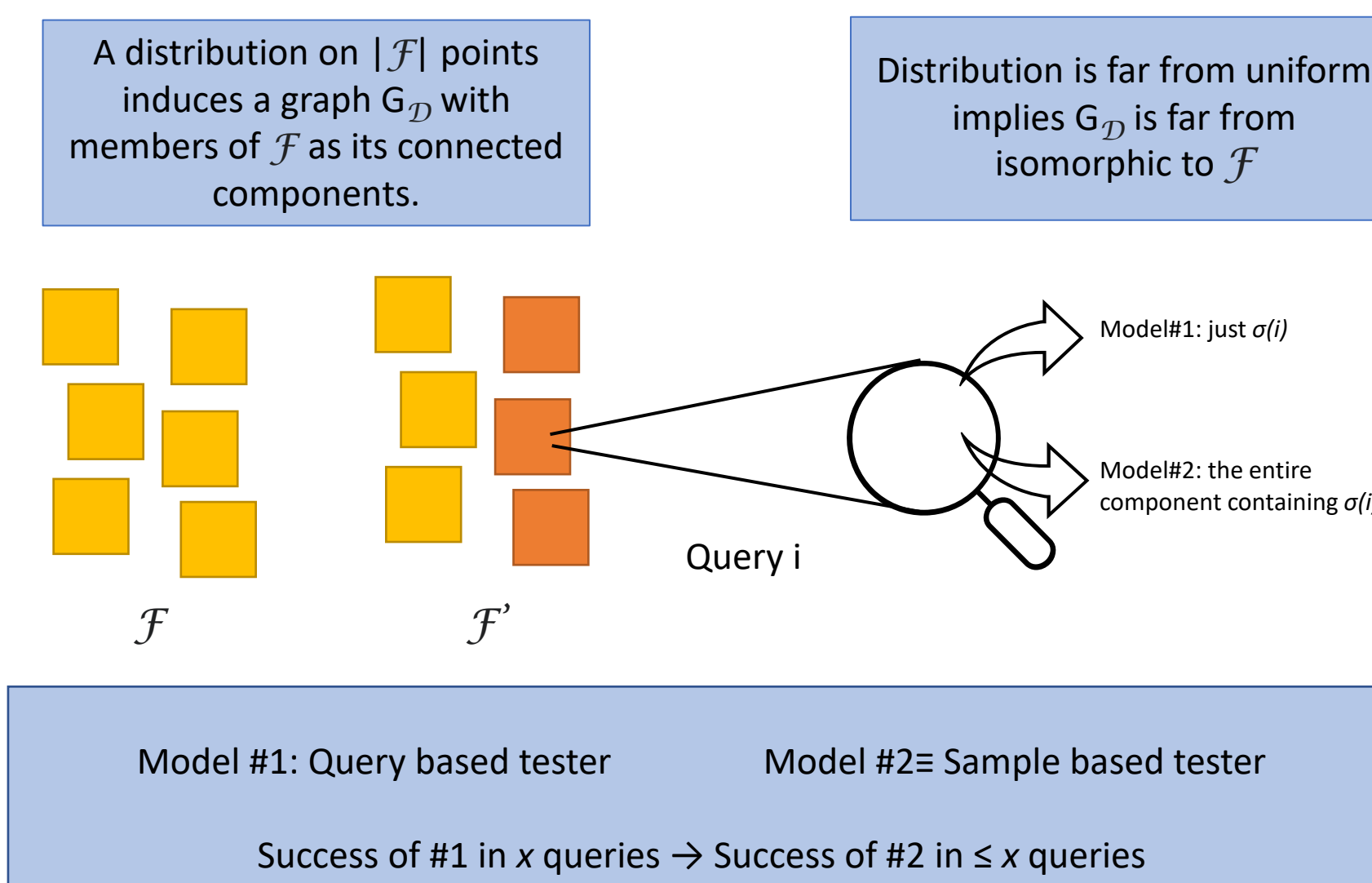
Constructing a large family

- Given a parameter s , the family should have the following:
 - Size of the family is $\exp(\Omega(s^2))$
 - Each member has balanced separators of size $\Omega(s)$
 - Members are pairwise $\Theta(1)$ far

Construct this family modifying the $s \times s$ grids; call it \mathcal{F} .



Graphs vs Distributions



Getting the Lower Bound

