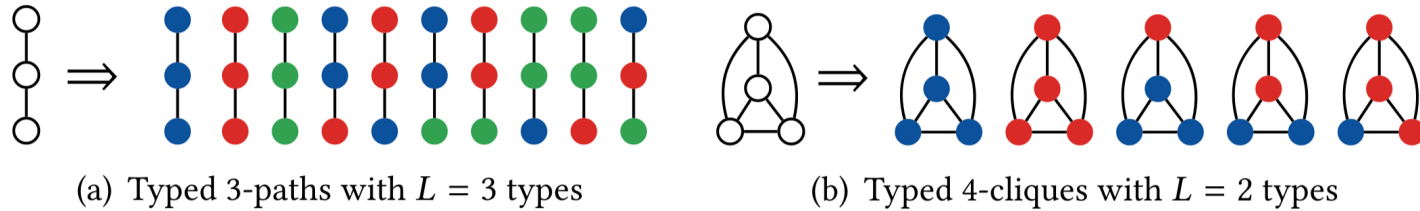


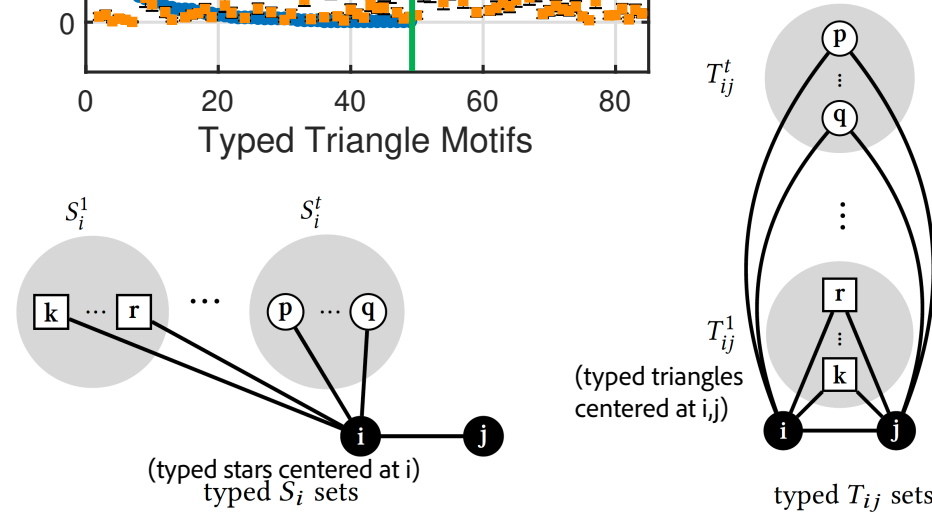
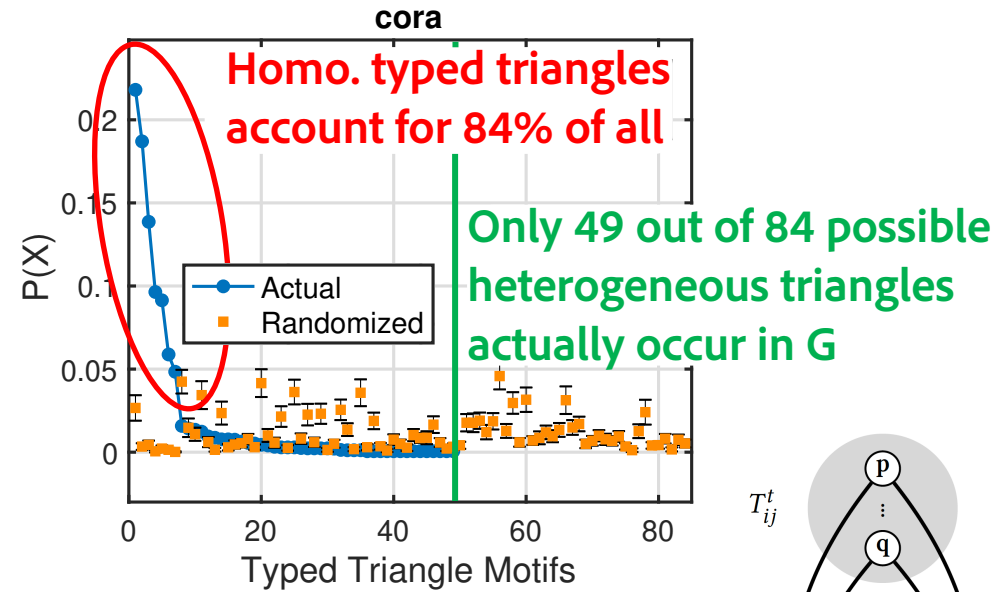
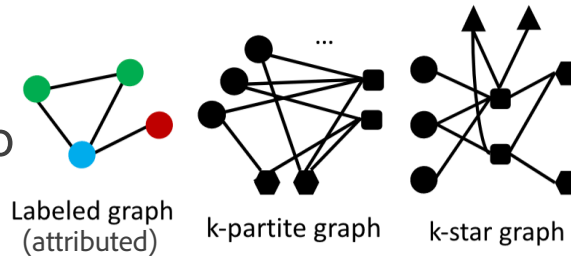
Heterogeneous Graphlets

(informal def.) A **typed/labeled/colored** induced subgraph



Main Contributions

- Generalized the notion of graphlet to heterogeneous/labeled graphs
- Described a computational framework for computing them that leverages *new typed combinatorial relationships* to obtain many counts in $o(1)$ constant time & avoid enumeration
- Proposed algorithm with worst-case time complexity that matches the best known algorithm for untyped graphlets
- Demonstrated the effectiveness of heterogeneous graphlets



Example: Given an edge with types ϕ_i and ϕ_j , select type t and t' , then compute counts in $o(1)$ using new equations involving $k-1$ node typed graphlet counts:

Clique-based Graphlets

(use $k-1$ node typed cliques)

Typed **chordal-cycle center** orbit count:

$$f_{ij}(g_{11}, t) = \begin{cases} \binom{|T_{ij}^t|}{2} - f_{ij}(g_{12}, t) & \text{if } t = t' \\ (|T_{ij}^t| \cdot |T_{ij}^{t'}|) - f_{ij}(g_{12}, t) & \text{otherwise} \end{cases}$$

4-cliques with type vector t