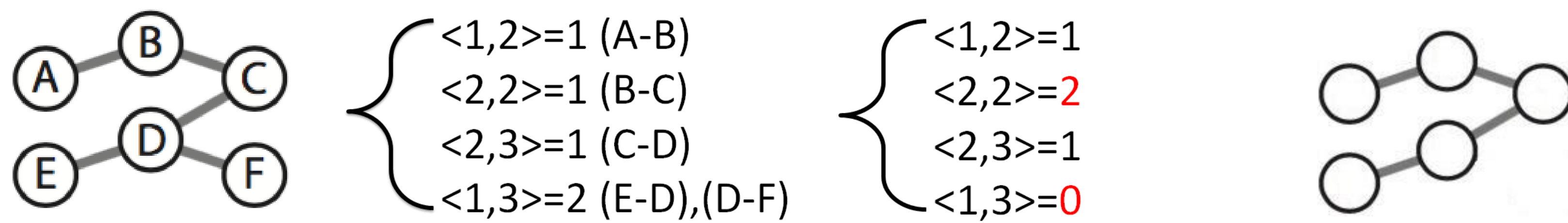


How much high level utility in anonymized social networks?

Student: Tianchong Gao; Advisor: Feng Li

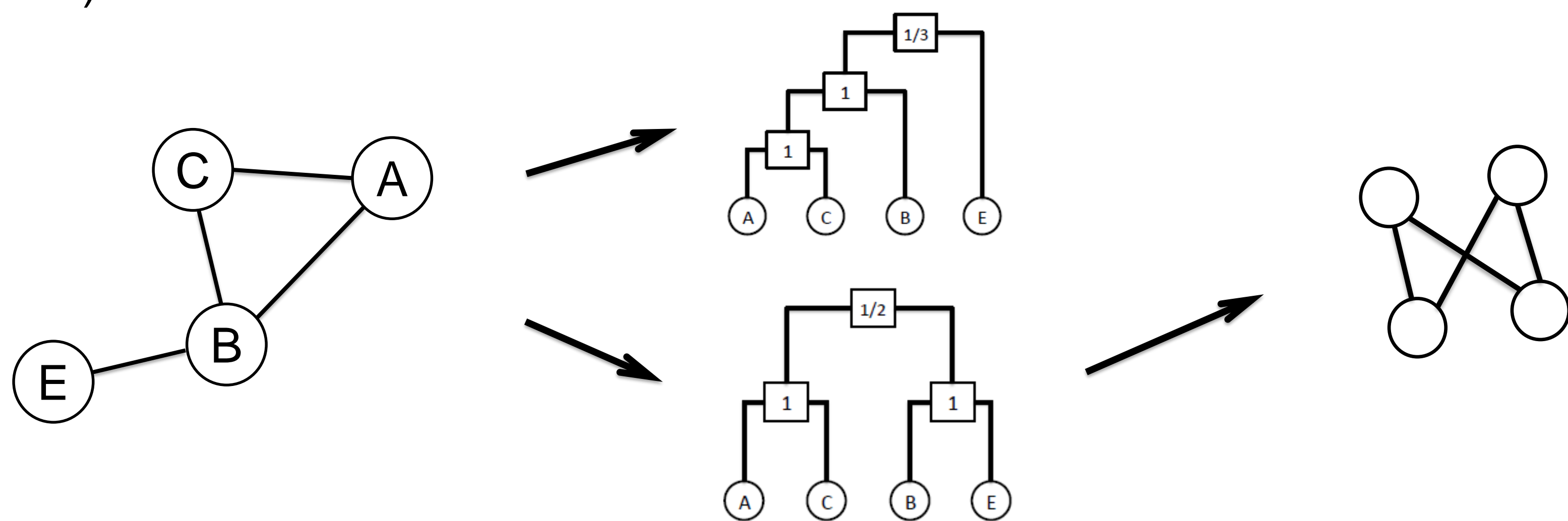
Differential privacy anonymization mechanism:

A) dK-2 series model



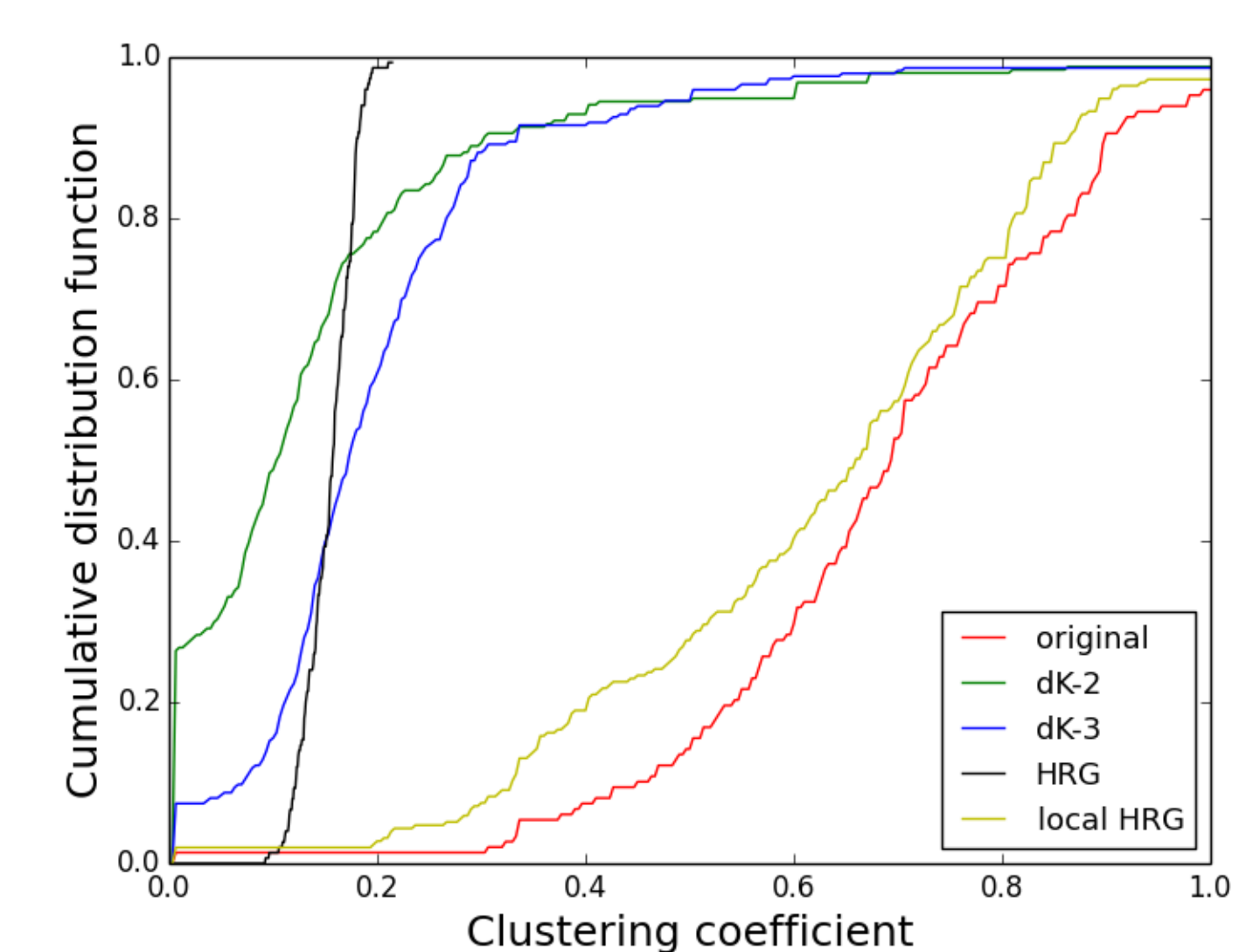
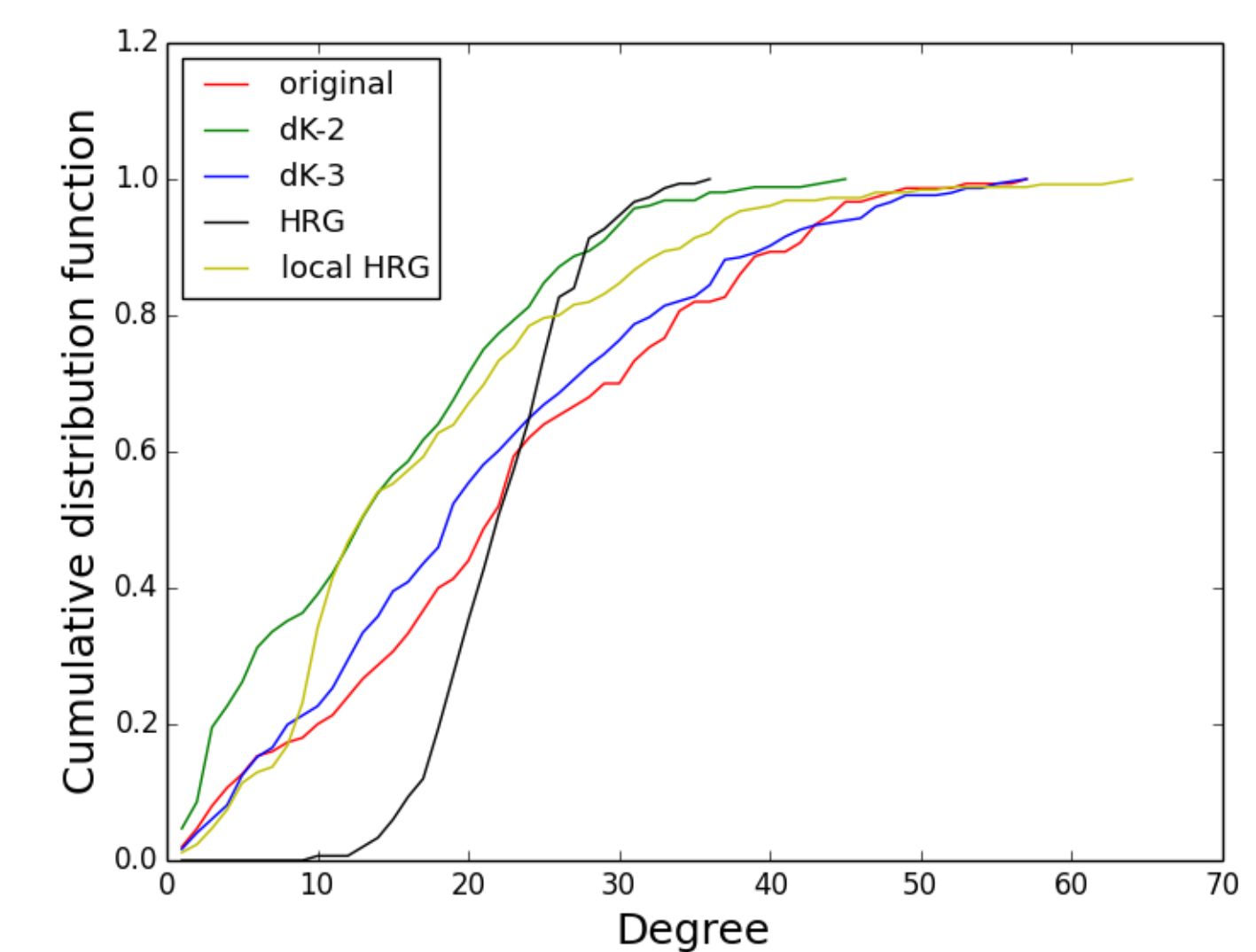
- 1) Original graph 2) dK-2 series 3) Perturbed dK-2 series 4) Perturbed graph

B) HRG model

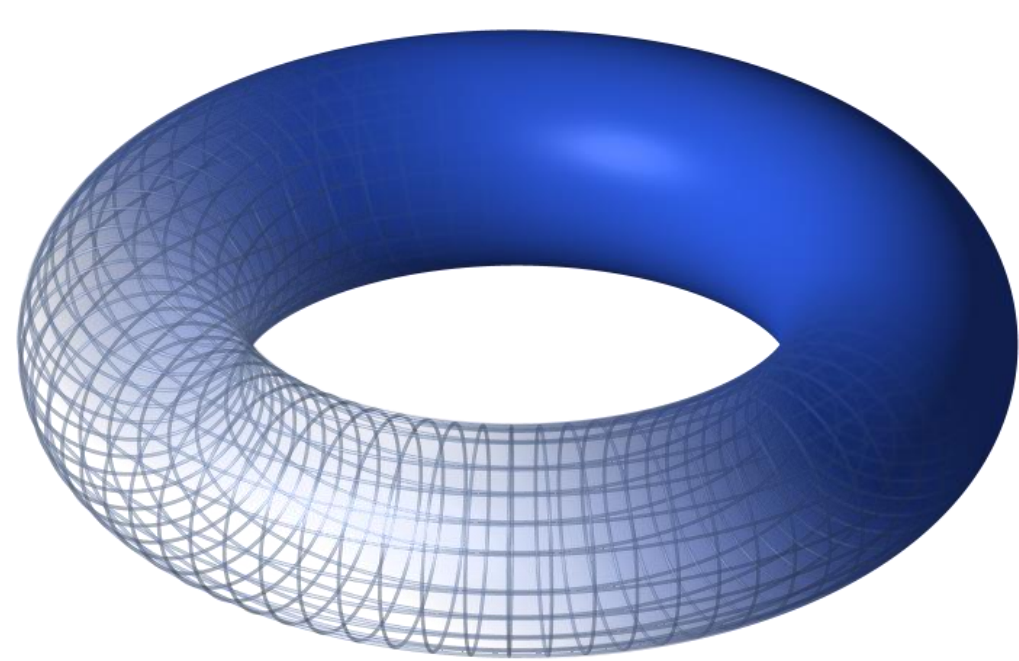
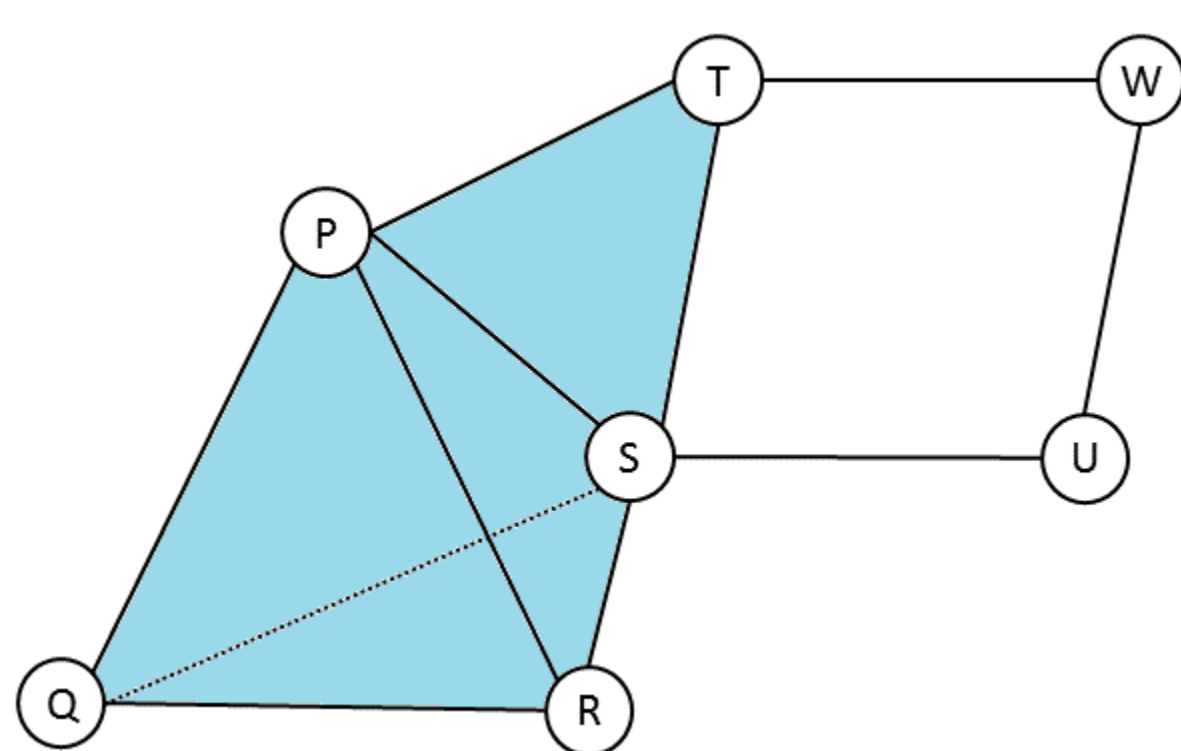


- 1) Original graph 2) HRGs 3) Perturbed graph

Traditional utility metrics:



High level utility: persistent homology [1]

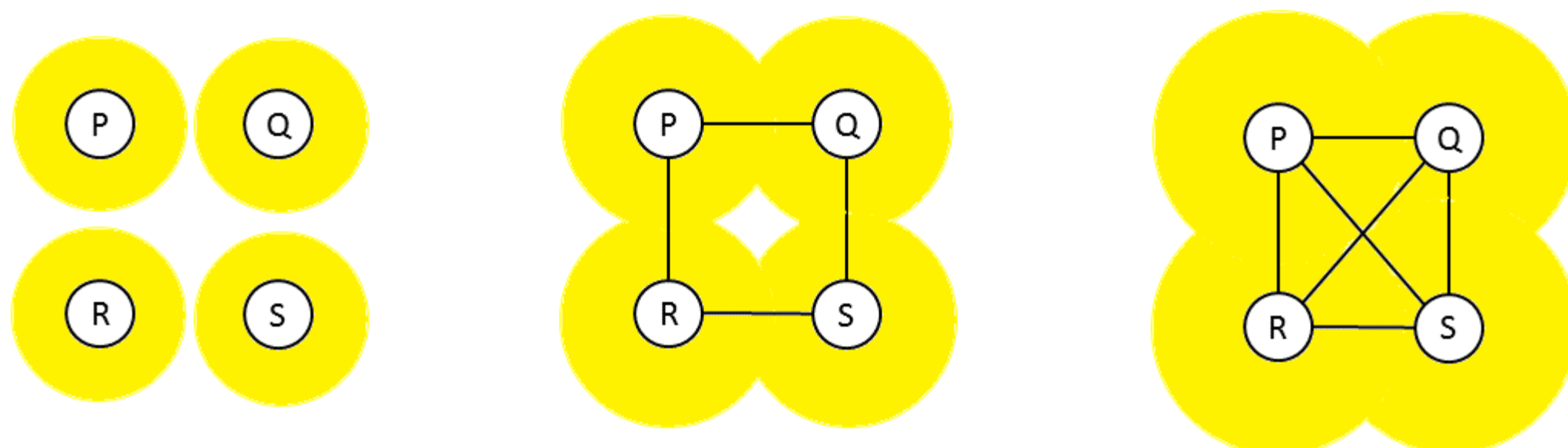


1) Simplicial complex

2) Betti number:

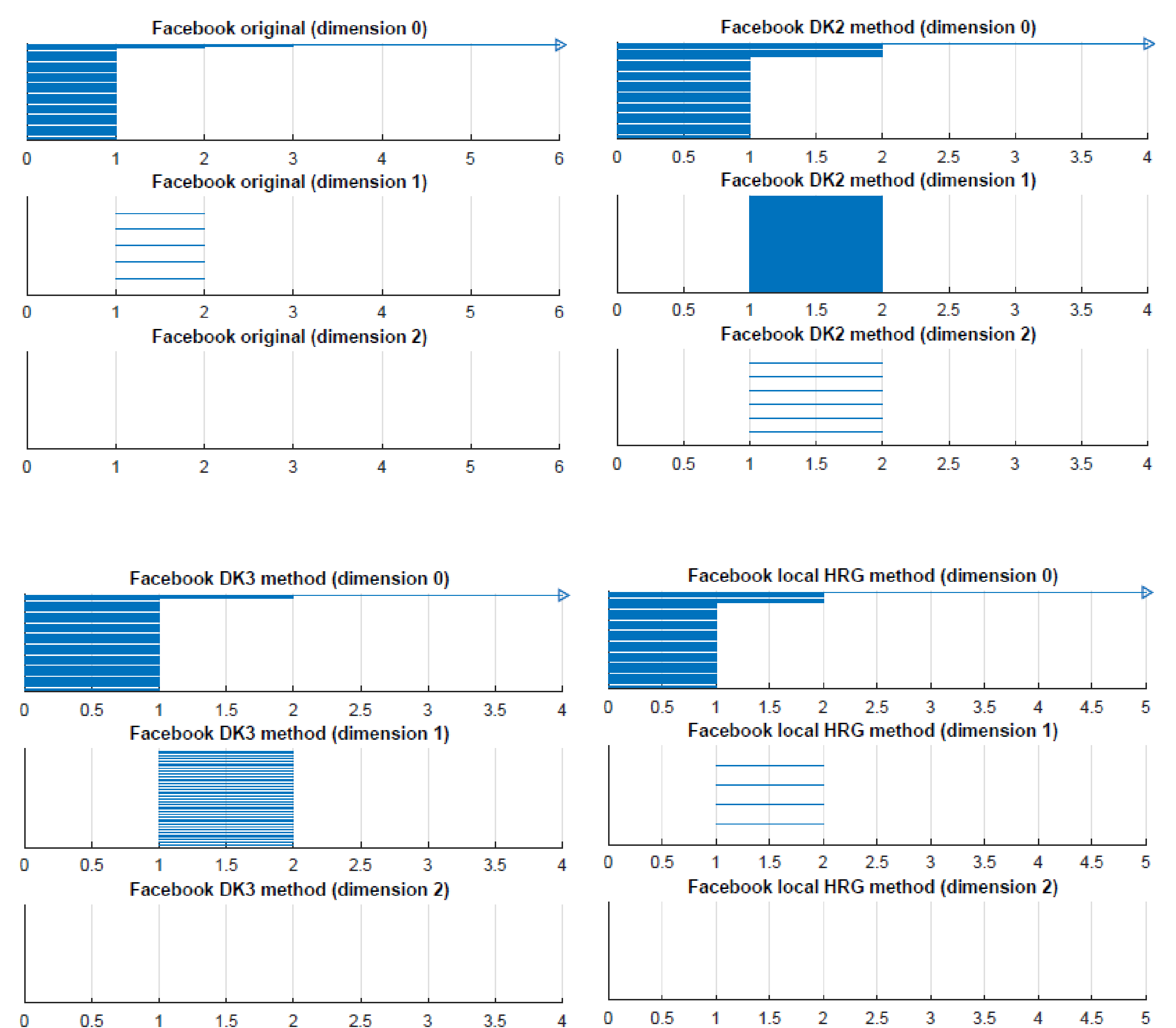
A torus has Betti numbers $b_0 = 1$, $b_1 = 2$, and $b_2 = 1$

$$K_0 \subseteq K_1 \subseteq \dots \subseteq K_n = K$$



3) Barcode

High level utility metric:



Reference:

[1] Petri G, Scolamiero M, Donato I, et al. Topological strata of weighted complex networks[J]. PloS one, 2013, 8(6): e66506.