Potential biological significance of reachability results

I. Pairs of nodes

$G = (V, E, w)$

We rank the resulting pairwise reachability probabilities (s_i, t_i, p_i) in descending order and investigate the functional annotations of the top pairs.

II. Effects of perturbation

1. Changing edge probabilities

$G_\Delta = (V, E, w_\Delta)$ ➔ Vector of pairwise probabilities $R_\Delta = [p_{1\Delta}, \dots, p_{k\Delta}]$

- We can investigate the changes to individual values of $(p_{i\Delta} - p_i)$
- We can investigate the change to the aggregate $r = \sum(p_{i\Delta} - p_i) / k$ for different values of Δ and different datasets

2. Changing network topology

$G_\Delta = (V, E_\Delta, w)$ ➔ Vector of pairwise probabilities $R_\Delta = [p_{1\Delta}, \dots, p_{k\Delta}]$

We can investigate the change to the aggregate $r = \sum(p_{i\Delta} - p_i) / k$ for different values of Δ and different datasets

III. Effects of uncertainty on network features

3. Node betweenness/centrality

Redefine betweenness/centrality for a probabilistic network; investigate the correlation between its value and the corresponding value for deterministic network with same topology

4. Prominent nodes/interactions

Investigate the effect of node removal, edge removal and or changing individual edge weights on the output pairwise reachability probabilities.