Metrics

For a graph with n nodes and m edges, we consider the following topological properties:

- **Node degree distribution.** We are particularly interested in the average node degree, $2m/n$.
- **Hop-depth distribution.** The hop-depth at node u is the depth of the shortest path tree rooted at u to all other nodes. The shortest path tree is constructed using unit weights on all edges, and the depth is measured using unit weights. In addition to the distribution information, we can evaluate two scalar properties: the **hop-based diameter** of the graph, that is the largest hop-depth, and the **average hop-depth**.
- **Length-depth distribution.** This is equivalent to hop-depth using the length metric. As above, we can evaluate the **length-based diameter** of the graph, and the **average length-depth**.
- **Routing-depth distribution.** The routing-depth at node u is the depth (measured in hops) of the shortest path tree (constructed using routing policy weights) from u to all other nodes. As above, we can evaluate the **route-based diameter** and hte **average route-based depth**.
- **Number of biconnected components.** A biconnected component ("bicomponent") is a maximal set of edges such that any two edges in the set are on a common simple cycle. This quantity is a measure of the degree of "connectedness" or "edge redundancy" in a graph.