CONSISTENCY OF CITATION AND COLLABORATION TOPOLOGY OF BIBLIOGRAPHIC DATABASES


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NETWORKS OF BIBLIOGRAPHIC DATABASES

Citation and collaboration networks extracted from bibliographic databases. These are: (Web) the Computer Science category of Web of Science until 2014 (979k papers); (APS) the American Physical Society publications until 2010 (459k papers); (PubMed) the PubMed Central Collection open access publications until 2014 (5.9M papers); (DBLP) the DBLP Computer Science Bibliography until 2014 (2.7M papers); (arXiv) the High Energy Physics Theory category of arXiv between 1992 and 2003 (28k papers); (CiteSeer) web publications parsed by the CiteSeer service (723k papers); (HistCite) Lederberg’s bibliography produced by the Algorithmic Historiography (9k papers).

NETWORK COMPARISON METHODOLOGY

Methodology of network-based statistical comparison of bibliographic databases. Networks representing bibliographic databases are compared through 21 graph statistics. Networks of bibliographic databases are compared through 21 graph statistics. Networks representing bibliographic databases are compared through 21 graph statistics. Networks representing bibliographic databases are compared through 21 graph statistics.

PROFILE OF PAPER CITATION NETWORKS

Distributions, diagrams, plots of paper citation networks extracted from bibliographic databases. Panels (A–F) show (from left to right): the field bow-tie decompositions, where the arrows illustrate the direction of the links and the areas of diagrams are proportional to the number of nodes with zero out-degree, non-zero degree and in-degree, respectively; the degree, in-degree and out-degree distributions of the databases, the clustering profiles of the standard, degree-corrected and delta-corrected coefficients; and the hop plots for the directed and undirected 90-percentile effective diameters d and d∗, respectively.

COMPARISON OF PAPER CITATION NETWORKS

Statistical comparison of bibliographic databases through statistics of paper citation networks. Panels (A–F) show studentized statistics residuals that are listed in decreasing order, while the shaded regions are 95% and 99% confidence intervals of independent Student t-tests (labelled with respective P-values). Panel (G) shows the residuals of merely independent statistics, where the shaded region is 95% confidence interval. Panel (H) shows pairwise Spearman correlations of independent statistics listed in the same order as in panel (G) (left) and the P-values of the corresponding Fisher independence z-tests (right). Panel (I) shows the critical difference diagram of Nemenyi post-hoc test for the independent statistics. The diagram illustrates the overall ranking of the databases, where those connected by a thick line show no statistically significant inconsistencies at P-value ≤ 0.05.