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Tracing the network of scientific collaboration FREE

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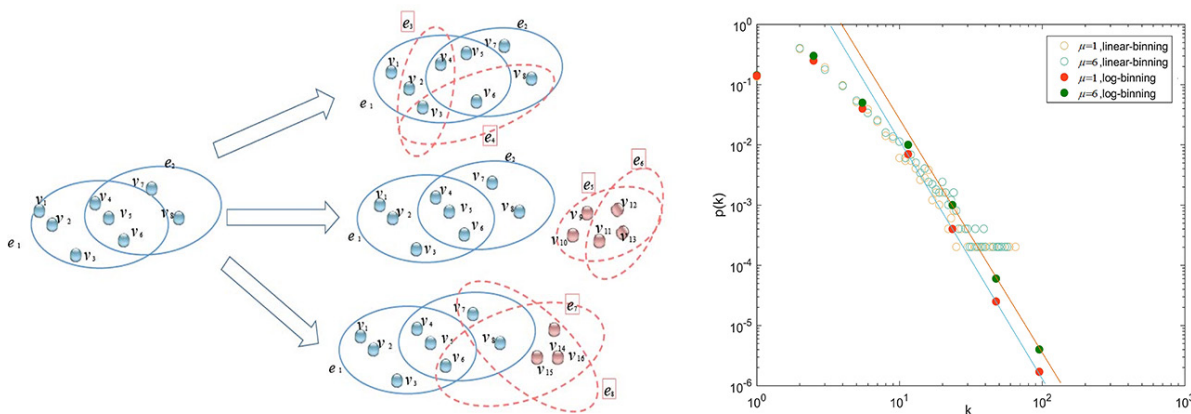


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Scholar hyperdegree distribution can be modeled as a power law distribution.



Scientific collaboration within and across fields can lead to higher quality research, but with increasingly complex and more globalized research, tracing the various collaborators and contributors to a new finding can be tricky. Li et al. theoretically show that scientific collaboration can be viewed as a dynamic, non-uniform evolution model. The new model could help researchers trace the scientific contributions that lead to discoveries in the modern world.

The model is based on a hypernetwork that can evolve over time, with scholars viewed as nodes and cooperative relationships (tracked as co-authors on a study) regarded as hyperedges that can form between any combination of old nodes (more established scholars) and – different from previous studies – new nodes (new scholars). They found that the hyperdegree distribution of nodes, corresponding to the degrees of separation or connection between one researcher and another, followed a power law distribution, indicating that as more scholars collaborate, more research can be published.

“This work is more in line with the evolution process of a scientific research cooperation network in reality,” co-author Daijun Wei said. “This paper makes further improvements to the scientific collaboration hypernetwork based on the evolution of other hypernetworks.”

To confirm their model, the authors theoretically proved, using known mathematical concepts like the Poisson distribution, that the hyperdegree distribution of nodes followed a power law distribution, and showed their formulas matched well with numerical simulations performed at different parameters.

The authors plan to extend their research by changing the model to better reflect reality, such as considering the scholar’s experience level and field.

Source: “Dynamical evolution behavior of scientific collaboration hypernetwork,” by Xiangbo Li, Gangjin Wang, and Daijun Wei, *AIP Advances* (2022). The article can be accessed at <https://doi.org/10.1063/5.0106793>.

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