

**Tang, Minh; Athreya, Avanti; Sussman, Daniel L.; Lyzinski, Vince; Priebe, Carey E.**  
**A nonparametric two-sample hypothesis testing problem for random graphs.** (English)

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Summary: We consider the problem of testing whether two independent finite-dimensional random dot product graphs have generating latent positions that are drawn from the same distribution, or distributions that are related via scaling or projection. We propose a test statistic that is a kernel-based function of the estimated latent positions obtained from the adjacency spectral embedding for each graph. We show that our test statistic using the estimated latent positions converges to the test statistic obtained using the true but unknown latent positions and hence that our proposed test procedure is consistent across a broad range of alternatives. Our proof of consistency hinges upon a novel concentration inequality for the suprema of an empirical process in the estimated latent positions setting.

**MSC:**

- 62G10 Nonparametric hypothesis testing
- 05C80 Random graphs (graph-theoretic aspects)
- 60F05 Central limit and other weak theorems
- 60F17 Functional limit theorems; invariance principles
- 62G20 Asymptotic properties of nonparametric inference

Cited in 11 Documents

**Keywords:**

empirical process; nonparametric graph inference; random dot product graph

**Full Text:** [DOI](#)