

Referee report on:

The locally Gaussian partial correlation

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The paper is interesting and well written. However, I have the following comments:

1. What is the difference between your approach and the existing nonparametric approaches that use Kernel functions (e.g. Normal Kernel) to locally approximate joint distribution functions?
2. Using estimated Z (obtained from the empirical distribution of X) instead of the true Z introduces some estimation effect/error. Might be this error is not negligible for finite samples. Did you examine the impact of this estimation error on the estimation of dependence on testing independence when the sample size is small?
3. One limitation of your testing procedure is you can only test independence between two scalars (X_1 and X_2). This is a big issue for testing Granger non-causality, because X_1 or X_2 has to be a vector if many lags are needed for Granger causality analysis.
4. The asymptotic and bootstrap theories for the test statistic of conditional independence are missing. I appreciate the authors refer to some papers for this, but it will be valuable for readers if these theories can be adapted in the context of the current paper and the results can be included in the paper.
5. A theoretical discussion on how your test compares to the existing tests (in term of rate of convergence) will be appreciated.
6. In the simulation part, I think you should consider other distributions other than normal distribution. Your test is optimal when the joint distribution is normally distributed. Thus, I believe it is an unfair comparison with Su and White tests and other tests that are fully non-parametric.