

## Comparison of random graphs

Suppose to be given two (or more) random graphs  $\mathbf{Y} = (Y_{ij})$  and  $\mathbf{Z} = (Z_{ij})$  over the same set of vertices  $V = \{1, \dots, n\}$ . The null hypothesis of stationarity means that the underlying edge probability matrices  $\mathbf{A} = (a_{ij}) = (\mathbb{P}(Y_{ij} = 1))$  and  $\mathbf{B} = (b_{ij}) = (\mathbb{P}(Z_{ij} = 1))$  coincide. The test procedure AWGC (graph comparison) can compare the stochastic block structure for both matrices: run AWCD for  $\mathbf{Y}$  and  $\mathbf{Z}$  independently and then compare the obtained results.

Workpackages:

1. Efficient scalable implementation of the AWGS based on AWCD
2. Calibration for the given first kind error and for different distances between the estimated vectors  $\tilde{\mathbf{A}}$  and  $\tilde{\mathbf{B}}$
3. Exploring the theoretical properties of the AWGS including power and separation rate,
4. Application to financial, economic, and energy market

Literature: Efimov, Adamyan, Spokoiny (2017) Adaptive nonparametric clustering. arxiv 1709.09102.

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