Network generation

Various network generating models were proposed to mimic empirical networks [1]. In this project two generative models should be investigated – configurational model of network generation with a given (scale-free) degree sequences [2] and a model for protein interaction networks [3].

- Do the literature research.
- Implement the configuration model for scale-free degree distributions using the algorithm from [2]. Compare it with the classical configuration model. Compare different network sizes.
- Implement the model for protein interaction network. Download from `string-db.org` the network for a different protein interaction network for species not used in the original publication. Investigate the quality of the model.
- [Optional] A generalization of the configurational model could be used to generate random networks with high-order correlations (clustering) [4]. Implement this model to describe the clustering of protein interaction networks above. How elaborate is this approach compared to the model from [3]?

References

[1] S Boccaletti, et al., Complex networks: structure and dynamics, Phys Rep, vol. 424, p. 175 (2006)
[1] M Catanzaro, et al., Generation of uncorrelated random scale-free networks, Phys Rev E, vol. 71, p. 027103 (2005)
[2] C M Schneider, et al., Modeling the topology of protein interaction networks, Phys Rev E, vol. 84, p. 016112 (2011)
[3] M E J Newman, Random graphs with clustering, Phys Rev Lett, vol. 103, p. 058701 (2009)