# Network Science - Final Project Proposal

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In our final project we want to assess how infectious diseases (for example SARS-CoV-2) spread on social networks. The nodes represent individuals and the (potentially weighted) edges represent human connections. In every timestep, the disease might be transmitted between individuals which are connected via an edge. The transmission probability is proportional to the strength of the connection. For modelling epidemic on networks, many different types of models exist (e.g agent based models, compartment models). However, most of them are based on the assumption that a contact between two individuals happens with equal probability (so called homogeneous mixing assumption). This assumption simplifies the computation but often does not hold in reality. Therefore, we want to investigate whether and, if so, how the used model and the structure of the underlying network influences the predicted spread of the disease. If possible we want to validate our results by comparing them with real world data (case numbers, mild and severe cases, hospitalizations). Some promising simulations have already been run. Potentially interesting graphs for our experiment that we learned about in the lecture would be Facebook Friendships, Sex Workers, Erdös Renyi Graphs (frequently used in literature). The Actors and Jazz Collaborations graph could potentially be investigated as well. If we can construct further interesting graphs from real world data (e.g contact tracing data), these will also be considered.
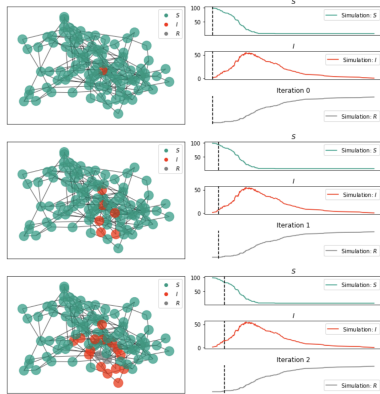
(a) Sample disease propagation on randomly weighted network
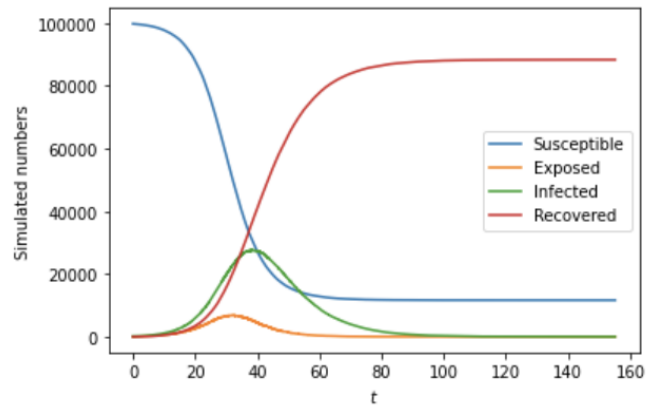
(b) SEIR simulation on random graph

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