Final: Time dependent networks

The goal of this study is to develop time dependent help networks for disasters and study their implications. Consider an ABS using Osotua like rules on a network of neighbors that can help. Choose random disasters and their strengths from the basic Osotua model. Choose an asking policy, survival thresholds and initial herd sizes and keep them fixed. Consider Watts-Strogatz type of networks of 200 herders. Create new edges and new nodes and monitor the impact of these time dependent networks. Specifically:

1. Over the course of the simulation, nodes get eliminated and hence the initial network structures get changed. Start with characterizing the changes of the networks. Determine the time evolution of

   (a) the mean degree;
   (b) the clustering coefficient;
   (c) the number of components.

2. When a node gets eliminated, redistribute the links that the node had over the surviving nodes in such a way that the total mean degree stays the same. You can do that in many different ways:

   • Randomly;
   • Randomly at one end of the edge while keeping the other one fixed;
   • Randomly with preferential attachment;
   • Randomly with anti-preferential attachment.
   • Others?

   In all these cases your main observable should be the mean survival rate at 50 years. In addition, you may look into the survival rate as a function of time and see whether any of these changes make a systematic difference. In addition, determine whether the redistribution of the networks changes the time evolution of the clustering coefficient and the number of components at 50 years.

Discuss all of your results and present intuitive ideas that may be an explanation for your findings.

Timeline: Present your results to the class in a 20-30 minute talk in the week of April 27. Submit a written report by May 9.