

## Literature Search And Expected Results, Sam

Herrera and Zufiria use a random walk algorithm to generate a scale-free network in [1]. They also outline a more traditional approach to generating a scale free network in the beginning of the paper. That approach is outlined here:

### Initializing

1. Initialize the graph with  $m_0$  nodes
2. Create an edge between each of the initial nodes

In our implementation,  $m_0$  was chosen to be 5.

### Filling out Rest of Nodes

For each remaining node to be generated, the node must be connected to  $m$  nodes. In our implementation,  $m$  was also chosen to be 5.

Determine which node to connect the new node to was done using a probabilistic distribution where:

$$p_i = \frac{k_i}{\sum_{j=1}^n k_j}$$

Where  $k_i$  represents the number of edges connected to node  $i$ , and  $n$  is the set of nodes already in the graph that are not already connected to node  $i$ . We draw from this distribution  $m$  times, each time updating the set  $n$  to no longer include the last edge that node  $i$  was connected to.

## Graph Analysis, Jipeng

### References

- [1.] latexcompanion Carlos Herrera and Pedro J. Zufiria. *Generating Scale-free Networks with Adjustable Clustering Coefficient Via Random Walks*. <http://arxiv.org/pdf/1105.3347.pdf>