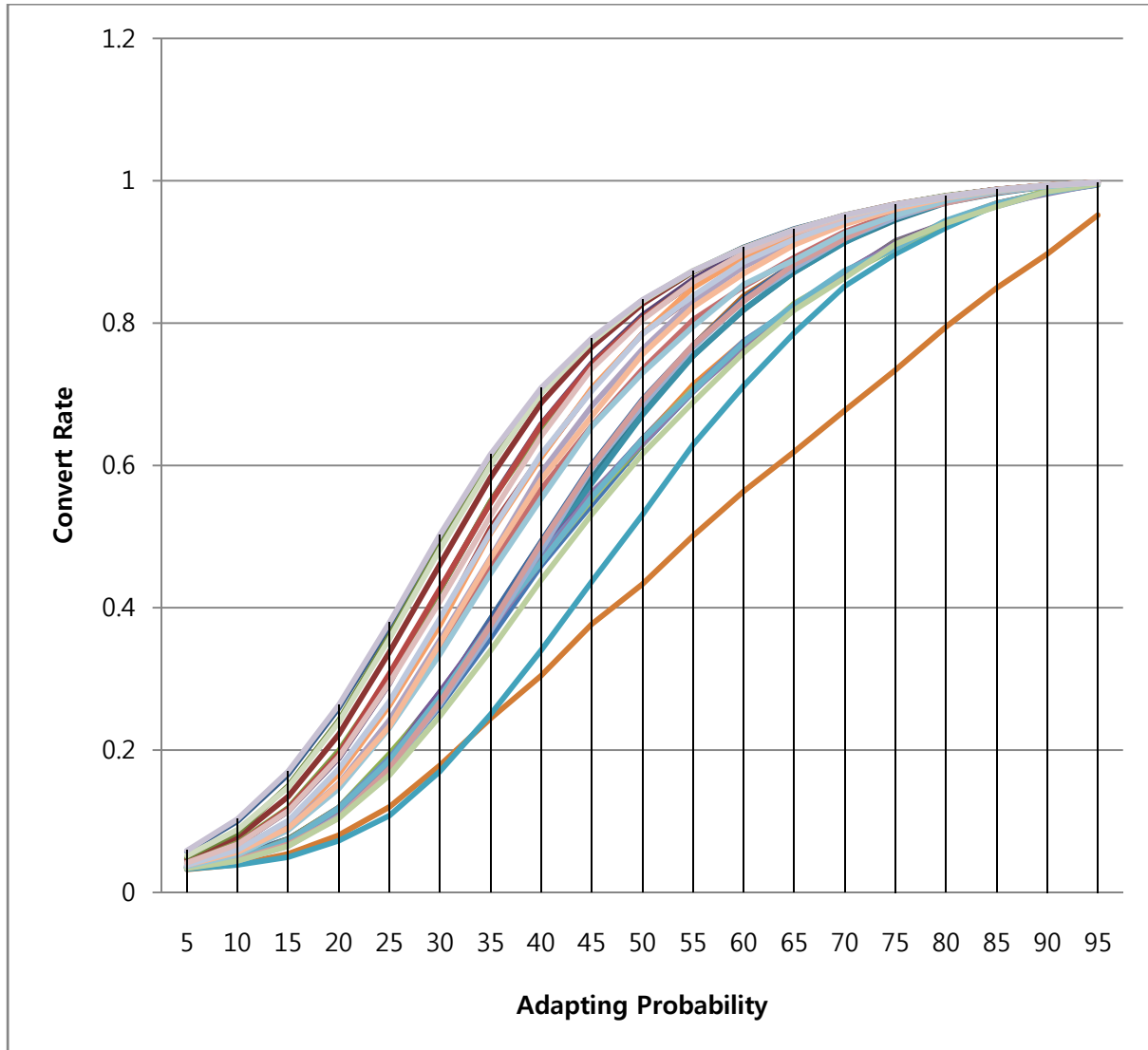


A Probabilistic Model of Information Flow

Hypothesis: Node with higher degree would have bigger impact to the network in general regardless of what the probability of adapting new technology is. However, the differences of impact between each node would be smaller when probability of adapting new technology is either too high or too low.



Results from average of 10000 simulations

From the Simulation, we can observe that there aren't many crossovers between each line which represents the node. We can also observe that the difference in convert rate of highest and lowest at given probability is smaller when probability is either too small or too high.

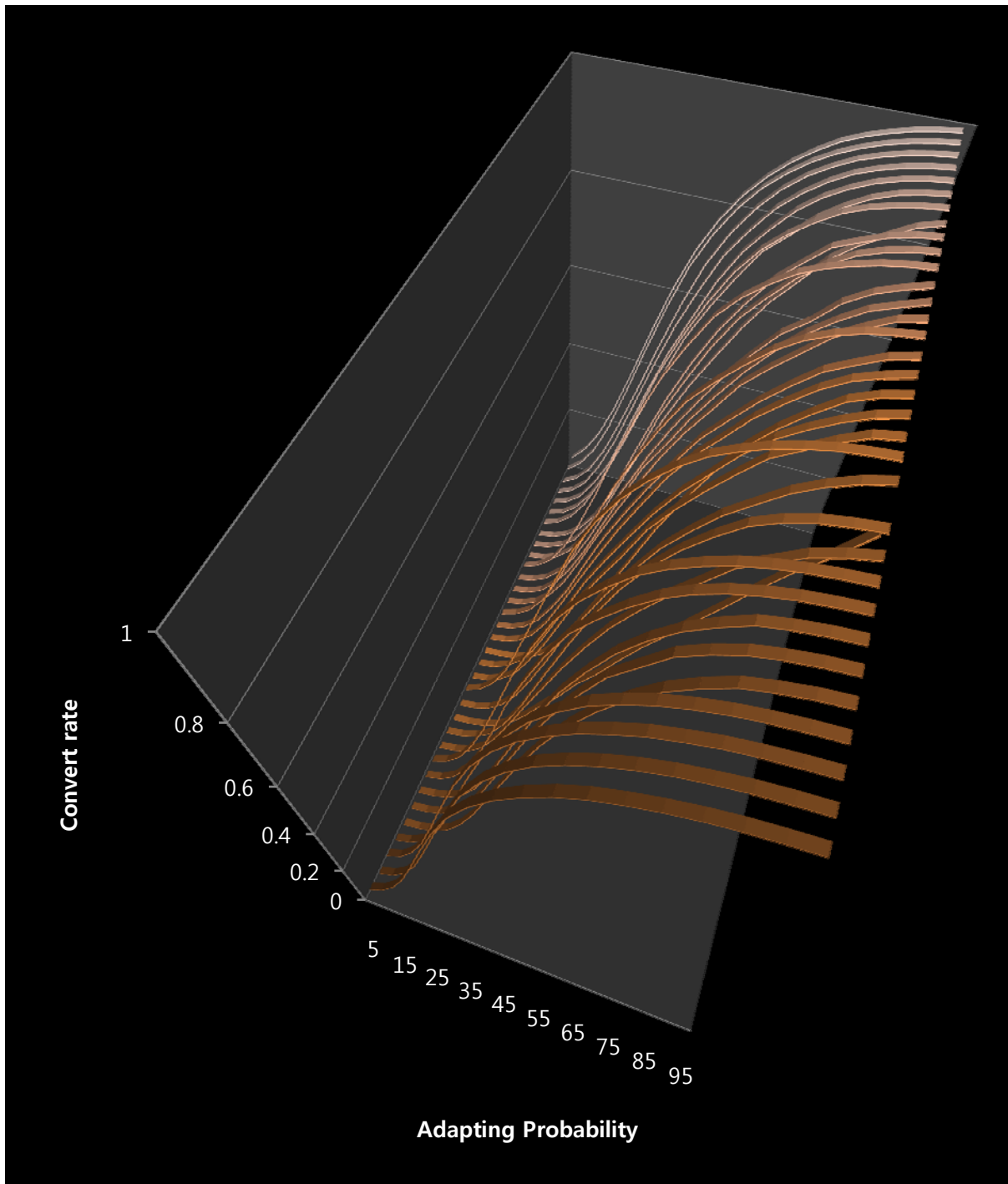
This is very similar to my hypothesis. However, this brings me another question. If my hypothesis is correct, we shouldn't even have any crossover between each line. I can think of this phenomenon in two ways.

First, it might be just caused from this being a simulation. It has some randomness to it. So, even though one node is little bit better than the other node, it just happened to be not like that at some probabilities because of randomness in simulation.

Second, this might really mean something. Maybe higher degree is not the only thing that matters. It also matters how your friends are connected to other friends. How many friends that your neighbors

have should have effect on the spread of technology. Then, it becomes a problem of what the entire network looks like. So, there might be the case where node with smaller number of neighbors is more effective in spread of technology. Then, at lower probability, those nodes with smaller degree won't be even able to convert any neighbors which decrease the average value. In this case, These nodes will start low, but then crossover with another line with node with higher degree.

If I had more time, I would have calculated actual mathematical expectation value of convert rate, and then compare with the simulation result. Below is another visualization of the same result.



A Model of Peer-Pressure

1) For KarateLinearNet.txt

The best initial user is Node 0.

The best two initial users are Node 0 & Node 32.

The best three initial users are Node 0, Node 1, & Node 32.

2) People, who have many friends and also cautious in adapting new technology, would have generally more influence on others. Cautiousness can be determined from their threshold value. How much each person influences the network can be determined from running simulation of probabilistic model.

Let's choose a constant probability p . (ex. $p = 0.4$)

When we are determining the bias of $B_{i,j}$, we can run ProbModelDriver for node j with probability p and calculate the conversion rate. Then, multiply the threshold value of node j to that conversion rate to get bias value of $B_{i,j}$.

This will well represents how much each people have influences on each other, and also it has randomness to it since we are running the simulation on node j for each different i .