LN fee bounds: Implementation plan

sketch

0.0.1 parameters/class

- payments: $\lambda, c, p \in \mathbb{R}$, sender address, reciever address, (add route later)
- Channels (parent class): $m, ibd, obd \in \mathbb{R}$ (size and balances), payments, name
- Unidirectional channels: Channels, cost $(\sqrt{\frac{2B\lambda c}{r}})$
- Bidirectional channels: Channels x 2, cost $(3(\frac{2B\lambda}{r})^{1/3})$
- Node: $R \in \mathbb{R}$ (revenue), address, list of channels, payments,
- Network: nodes, $B, r \in \mathbb{R}$, time

0.0.2 overview

The network contains nodes, each has a set of existing channels and payments.

The simulation selects a node to make additional payment to a nonneighbor. Change p and observe if the node should make a directed channel or use an intermediate node. For the intermediate node, observe how its revenue changes.

0.0.3 assumptions

- Intermediate node is responsible for the change in cost of the channels
- The sender node pays all the transaction fee
- B, r are costant throughout channel lifetime
- channel lifetime and time between each transaction are random variables

0.0.4 functions

channel: getNumTX (k), getLifetime $(\tau(\alpha))$, getTxFee $(T(\alpha))$, getOppoCost $(I(\alpha))$, getChannelCost (depends on the type of the channel)

0.0.5 implementation

At the start, build the network with 3 nodes: Alice, Bob, and Charlie. Construct an unidirectional channel between Alice and Bob, and then construct a bidirectional channel between Bob and Charlie. Set the average channel lifetime and frequency parameters. Also provide B, r.

At each round, generate the time between the transactions Alice makes.

Bob and Charlie's transaction depends on λ.

The independent variable is p, the dependent varaible for Alice is the cost of direct channels and transactions fee, and the independent variable for Bob is his revenue.

Compare the result with lower and upper bound calculations