Networks and Markets

Hw2 submission

Part 5: Experimental Evaluations

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10.

(b)  
i. Let

be a capacitated graph, where:

for every matching , we can define the following flow in :

And that's easy to see that .

Also, let be an integer max flow in the graph, then we can define a matching by

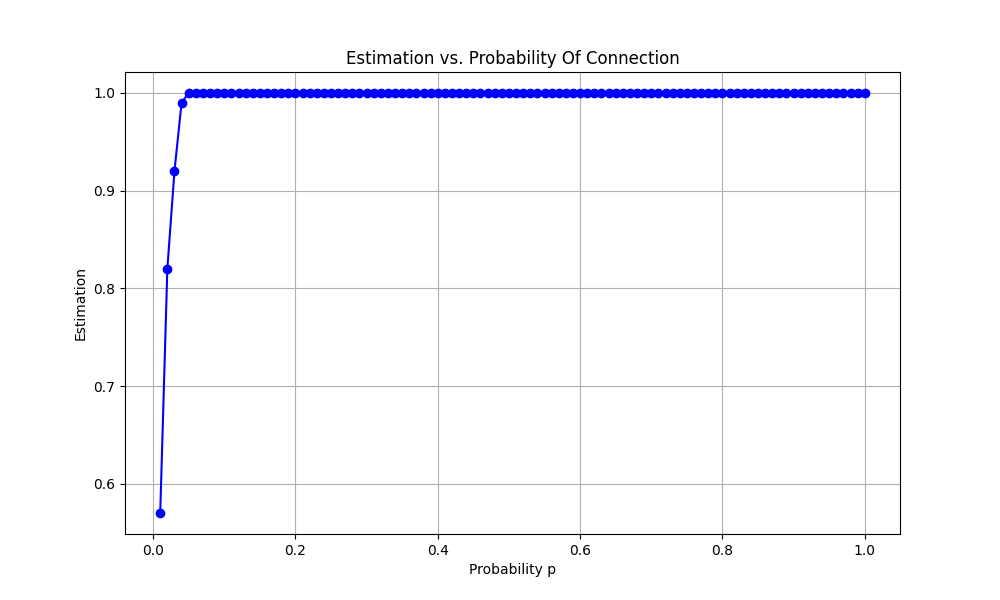
is a matching because there's only one edge that goes into each and its capacity is , and therefore, there can't be more than one s.t   
.

We've seen that for every matching , there's a flow , s.t. , and that there's a matching for the integer max-flow , s.t.   
, and therefore if there's an integer max-flow, its value is the maximal number of matches.

However, as a corollary from the Augmenting Path algorithm there's an integer max-flow, and therefore we can run on the augmenting path algorithm to find an integer max-flow and output the maximal flow's value as the maximum number of matches.

ii. In part i, we've seen how to define a maximal matching from an integer max-flow in (definition ), we can find that integer max-flow by running the augmenting path algorithm on and then use definition to find the maximal matching.

(b) We fixed because was too much. We got the following results:



to estimate the probability we computed a case of drivers and riders where each driver could be connected to each rider with probability , then we fixed the connections according to that to or , and divided the size of the maximal matching by .