Introduction to Optimization
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Consider the "Telecommunications Routing Example" discussed in the file telco_example.pdf.

(a) Provide an LP which solves for the total maximum throughput of the network.

(b) Solve the problem in Excel.

(c) Suppose the information transmitted from source 1 to destination 1 has higher priority than that transmitted from source 2 to destination 2. Specifically, let us consider the case where we would like to optimize the throughput from source 2 to destination 2 plus four times the throughput from source 1 to destination 1. Modify the objective function to accommodate this. Run Solver again.

(d) Assume that information transmitted from source 1 to destination 1 continues to have higher priority, as specified in the previous part. But now, some changes have taken place in the network. Links (3,7), (8,10), and (9,13) have gone down. On the other hand, there are new links: (3,8) with a capacity of 4 and (8,13) with a capacity of 2. Finally the capacity of link (8,11) has increased to 2 and link (10,13) to 4. Make the appropriate changes and run Solver again.

(e) Will the basic feasible solutions to the part (a) LP necessarily be integral? If so, explain why (or invoke the appropriate theorem from the course notes). If not, give a counterexample.