MS&E 235: Internet Commerce

Problem Session 2, April 22, 2009

1. Multi-armed bandits.

   Consider a telephone sales company (a company that calls you on your phone and offers to sell you goods) that sells only one good. This company does not distribute the good but simply takes a one dollar commission from another company that does. This company has (endless lists of) telephone numbers ready to be called for the first time. The team has called phone numbers with area code "201" fifty times and got one sale, and numbers with area code "918" one hundred forty times and got three sales.

   - The CEO and owner are fighting over which area code the team should focus on next, and they ask you to offer your opinion. What is your opinion? (Hint: you may need to try several discount factors).
   - How would your answer change if "201" area code phone calls each cost one cent more per call in long distance charges?

2. Individualistic and Social Choices.

   Consider the scenario similar to the system described in class. At time t, consumer number t comes into the system, first buys 1.0 units of a unique good – called good number t, and then buys units of goods 1, 2, ..., t-1 and some additional units of good t. In this second move he buys 1.0 goods in total, and buys the goods proportional to their percentage market share.

   - Determine the number of goods 1, 2, ..., 10 purchased at the end of time t = 10.
   - Fit a curve of the form $m(i) = a * i^{-e}$ to this data, by finding the constants a and e that give the best fit.
   - Based on the constant e that best fit the data, would you call this a long or short tail?

3. Consider the market for widgets. The most popular brand sells 2.7 times as many items as the second most popular brand. The second most popular brand sells 2.7 times as many items as the third, and so on with the third and fourth, etc.

   - Would you consider this a short or long tail?
   - What percentage of the market share is in the third position onward (down the tail)?