

Exercise No. 3
Peer-To-Peer Networks
Summer 2010

Exercise 1 Consider a Chord network. Let the address space be normed to 1 (instead of 2^m). Consider fixed intervals of the address space with the following sizes:

1) $A_1 = \frac{1}{2}$

2) $A_2 = \frac{\log n}{n}$

3) $A_3 = \frac{1}{n}$

4) $A_4 = \frac{1}{n^2}$

Answer the following questions for each of those intervals:

- a) What is the probability that the interval remains empty?
- b) What is the probability that the interval has exactly one peer?
- c) Partition the whole address space into intervals of that size. What is the expected amount of such intervals having exactly one peer?