Concentration of Measure for the Analysis of Randomized Algorithms

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Errata Corrige

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In this note corrections appear in increasing order of page number.

1 From page 21, line +17 until the end of §2.1 on page 22

The argument is a bit murky. It can be replaced by the following:

We have observed that the cost of the search is equal to the number of tosses of a coin of bias p that are necessary until we obtain H successes. That is, we flip the coin repeatedly and stop as soon as we observe H successes. The difficulty here is that the random variable we are studying is the sum of geometrically distributed random variables. The distribution of this random variable is called *negative binomial* and some of its properties are explored in the problem section. Here, we take a different approach.

To fix ideas, let $p := \frac{1}{2}$. Suppose that we toss the coin L times where

$$L := 14 \log n.$$

Let X denote the number of successes. Then $E[X] = L/2$ and let $t := 4 \log n$. By (1.6) we have that

$$\Pr(X \leq E[X] - t) \leq e^{-2t^2/L} \leq \frac{1}{n^2}. \tag{1}$$

In other words, if we toss a coin L times, the probability that we do not see $3 \log n$ successes is at most $\frac{1}{n^2}$. Things can go wrong in two ways: either we do not observe $3 \log n$ successes in a sequence of L coin tosses, or the number of successes is greater than $3 \log n$. By Proposition 2.1, $\Pr(H > 3 \log n) \leq n^{-2}$. Therefore, the probability that a search costs more than L is at most $\frac{2}{n^2}$.

2 Page 62, Definition 5.2

"..for some reals a, b_i..." $\longrightarrow$ *"..for some reals a_i, b_i..."*

3 Page 90, line -2

"..distribution X, denoted as.." $\longrightarrow$ *"..distribution of X, denoted as.."*

4 Page 100, line -9

Reference [66] should be [67].