

Exercise Sheet 4 for Algorithms of Bioinformatics (Winter 2025/26)

Hand In: Until 2025-11-14 18:00, on ILIAS.

Problem 1

30 points

Consider the following biased coin: With probability p , it shows H (heads) and with probability $q := 1 - p$, it shows T (tails).

Let X be the random number of coin tosses until the pattern THTTH appears for the first time.

Compute the probability generating function $G_X(z)$ for X and determine the expected value and the variance of X as a function of p .