Homework Problem: More Coin Tossing

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10/10 points (graded)

Consider a sequence of independent coin tosses, and let θ be the probability of heads at each toss.

Fix some k and let N be the number of tosses until the kth head occurs. Find the ML estimator $\hat{\theta}$ of θ based on N (i.e., the only observation you have is seeing N once). Express your answer in terms of k and N.

Hint: You'll first want to derive what the probability table $p_N(\cdot;\theta)$ is. By how the problem is set up, if the n-th toss is for sure the k-th heads, then what is the probability of any particular sequence that has k heads, and how many sequences are there for which the n-th toss is precisely the first toss for which we see the k-th heads?

Please provide your answer as a mathematical formula (and not as Python code). Use ^ for exponentiation, e.g., x^2 denotes x^2. Explicitly include multiplication using *, e.g. x*y is xy.

k/N ✔

$\frac{k}{N}$

Submit You have used 1 of 5 attempts

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