
HW VII: Continuous distributions

(due before April 11th at 8:00)

1. Let X and Y be independent exponential random variables with parameters μ and ν . Compute the density of $X + Y$.
2. Let U_1, \dots, U_n be n independent random variables uniformly distributed on $[0, 1]$. For $i \in \{1, \dots, n\}$, we say that U_i is a *record* if $U_i \leq U_j$ for all $j \leq i$. Compute the expected number of records in the sequence U_1, \dots, U_n .
3. Suppose you have access to a uniform random variable $U \in [0, 1]$. Without using any additional randomness, generate a random variable X that has an exponential distribution with parameter θ .

Bonus: Can you generalize this procedure to generate X having any other distribution? (A brief answer is expected)