

Quals Question

Let the random variable X have CDF F . Suppose that $X_i \text{ iid} \sim X$.

(a) What is the CDF of $\max_{1 \leq i \leq n} X_i$?

(b) What is the CDF of $\min_{1 \leq i \leq n} X_i$?

Suppose now that $X_{i,j} \text{ iid} \sim X$

(c) What is the CDF of $f(n, m) = \max_{1 \leq i \leq n} \min_{1 \leq j \leq m} X_{i,j}$?

(d) Suppose $X \sim \text{exponential}(\lambda)$. Let $Y_m = f(e^{\beta m}, m)$, for some parameter $\beta > 0$. What does Y_m converge to as $m \rightarrow \infty$? In what sense?

(e) Repeat the previous part for the general case $X \sim F$ (can assume that F is continuous and strictly increasing).