

Warmup: convergence of CDFs

Convergence of CDFs

Suppose that $X_1, X_2, \dots \stackrel{iid}{\sim} \text{Uniform}(0, 1)$, $X_{(n)} = \max\{X_1, \dots, X_n\}$, and let $Y_n = n(1 - X_{(n)})$.

1. Find the cdf $F_{Y_n}(t) = P(Y_n \leq t)$.
 2. Using question 1, and the fact that $\lim_{n \rightarrow \infty} \left(1 + \frac{x}{n}\right)^n = e^x$, show that for any given t , $F_{Y_n}(t) \rightarrow 1 - e^{-t}$.