

ECON 770. Intro to Econometrics

Recitation 6.

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1. We say $A, B \in \mathcal{F}$ are (pairwise) independent if

$$P(A \cap B) = P(A)P(B).$$

Give a counterexample showing that pairwise independence does not imply

$$P(A \cap B \cap C) = P(A)P(B)P(C).$$

2. Show that X follows an exponential distribution, $X \sim \gamma(1, \theta)$, if and only if

$$P[X > x + h | X > x]$$

is independent of x .

3. Give an example of two random variables X and Y on a measurable space (Ω, \mathcal{F}) and two probability measures P and Q on this space such that under P X, Y are independent while under Q they are not.
4. Let $\{X_j, 1 \leq j \leq n\}$ be independent random variables with distribution functions $\{F_j, 1 \leq j \leq n\}$, respectively. Find the distribution function of $\max_j X_j$ and $\min_j X_j$.
5. Consider (Ω, \mathcal{F}, P) a probability space. Are disjoint sets in \mathcal{F} independent?
6. Let $A, B \in \mathcal{F}$ be pairwise independent. Show that \bar{A} and B are independent (as well as A and \bar{B} , \bar{A} and \bar{B}).