

Assignments #01 of
Econometrics I & Advanced Econometrics I (2013SY)

April 17, 2013

Instruction to students

1. Dead line for submission: April 24, 2013. Please submit at the end of the class.
2. Use A4 size papers to answer.
3. The answer may be written in Japanese as well as English.

Q1.

Show the limit supremum and the limit infimum of a sequence of sets, if A_n ($n = 1, 2, \dots$) is given by,

$$(1) A_n = \left[\left(\frac{1}{2}\right)^{n-1}, 1 \right],$$

$$(2) A_n = \left[\frac{1}{n}, 1 \right],$$

respectively.

Q2.

Let $\Omega = \{R, G, B\}$. Then, please answer whether the following collection of subset of Ω is a family class or not with the reason.

$$(1) \mathfrak{S}_1 = \{\emptyset, \Omega\}$$

$$(2) \mathfrak{S}_2 = \{\emptyset, \{B\}, \{R, G\}, \Omega\}$$

$$(3) \mathfrak{S}_3 = \{\emptyset, \{R\}, \{G\}, \{B, G\}, \{R, G\}, \Omega\}$$

Q3.

Let \mathcal{A} be a σ -algebra and A_n ($n = 1, 2, \dots$) be a sequence of sets such that $A_n \in \mathcal{A}$. Then, show that it satisfies following properties.

- (1) $\liminf_{n \rightarrow \infty} A_n \in \mathcal{A}$
- (2) $\limsup_{n \rightarrow \infty} A_n \in \mathcal{A}$
- (3) $\liminf_{n \rightarrow \infty} A_n \subset \limsup_{n \rightarrow \infty} A_n$