



Measure Theory - Part 1 - Exercises

Exercise 1: Check if the following collection of subsets \mathcal{A} is a σ -algebra over the set $X = \{1, 2, 3, 4, 5, 6\}$.

(a) $\mathcal{A} = \{\emptyset, \{1\}, \{2\}, \{1, 2\}, \{3, 4, 5, 6\}, X\}$

(b) $\mathcal{A} = \{\emptyset, \{1, 3\}, \{2, 4, 5, 6\}, X\}$

(c) $\mathcal{A} = \{\emptyset, \{1\}, \{3\}, \{1, 3\}, \{2, 4, 5, 6\},$
 $\{1, 2, 4, 5, 6\}, \{2, 3, 4, 5, 6\}, X\}$

(d) $\mathcal{A} = \{\emptyset, \{1\}, \{4\}, \{5\}, \{1, 4\}, \{1, 5\}, \{4, 5\}, \{1, 4, 5\}$
 $\{1, 2, 3, 5, 6\}, \{2, 3, 4, 5, 6\}, \{1, 2, 3, 4, 6\}, X\}$

Exercise 2: Is the following collection of sets \mathcal{A} a σ -algebra over the set $X = [0, 2]$

$$\mathcal{A} = \{\emptyset, \{0\}, \{1\}, \{2\}, (0, 2], [0, 1) \cup (1, 2], [0, 2), X\}$$