Ch. 2 Set Theory

1 Universal Set

1.1 Definition

$$\Omega \equiv \Omega \subseteq S_i, \forall i \quad (Definition\ 1.1)$$

1.2 Proof of Existence Universal Set Ω

1.3 Properties of Universal Set Ω

Proofs in Appendix

2. $\Omega \cap \Omega = \Omega \quad (Theorem\ 1.1)$
3. $\Omega \cup \Omega = \Omega \quad (Theorem\ 1.2)$
4. $\Omega \cap S_i = S_i, \forall i \quad (Theorem\ 1.3)$
5. $\Omega \cup S_i = \Omega, \forall i \quad (Theorem\ 1.4)$

2 Empty Set

2.1 Definition

The "empty set" $\emptyset$ is defined as the complement of the Universal Set Ω

$$\emptyset \equiv \Omega_{\perp}$$

2.2 Proof of Existence Empty Set

2.3 Properties of Empty Set

1. $\Omega \subset \emptyset \quad (Theorem\ 2.1)$
2. $\emptyset \not\subseteq \Omega \quad (Theorem\ 2.2)$
3. $\emptyset \cup \emptyset = \emptyset \quad (Theorem\ 2.3)$
4. $\emptyset \cap \emptyset = \emptyset \quad (Theorem\ 2.4)$
5. $\emptyset \cap S_i = 0, \forall i \quad (Theorem\ 2.5)$
6. $\emptyset \cup S_i = S_i, \forall i \quad (Theorem\ 2.6)$
7. $\Omega \cup \emptyset = \Omega \quad (Theorem\ 2.7)$
8. $\Omega \cap \emptyset = \emptyset \quad (Theorem\ 2.8)$

3 Appendix

3.1 Proofs

1. $\Omega \subset \emptyset$
2. $\Omega \cap \Omega = \Omega$
3. $\Omega \cup \Omega = \Omega$
4. $\Omega \cup \emptyset = \Omega$
5. $\Omega \cap \emptyset = \emptyset$
6. $\Omega \cap S_i = S_i, \forall i$
7. $\Omega \cup S_i = \Omega, \forall i$
8. $\emptyset \not\subseteq \Omega$
9. $\emptyset \cup \emptyset = \emptyset$
10. $\emptyset \cap \emptyset = \emptyset$
11. $\emptyset \cap S_i = 0, \forall i$
12. $\emptyset \cup S_i = S_i, \forall i$