

5/10 Algebraic Systems

$$\boxed{\oplus: A \times A \rightarrow A}$$

Algebraic system ... closed ... of interest

Ex) $(\mathbb{N}, +)$, (\mathbb{N}, \times)

Semigroup (A, \oplus) ... associative
binary op \rightarrow n-ary op.

monoid $\sum_{i \in \{1, \dots, n\}} i^2 = \dots$

Identity (A, \oplus, e)

$\forall a \in A, a \oplus e = e \oplus a = a$... Neutrality ele.

$(\mathbb{N}, +, 0)$, $(\mathbb{N}, \times, 1)$ (V^*, \cdot, ϵ)

group $(A, \oplus, e, \oplus^{-1})$

inverse of $\oplus: \oplus^{-1}$

$a \oplus^{-1} b = e, b \oplus^{-1} a = e$

$\therefore b = a^{-1}$

Ex $(\mathbb{Z}, +, 0, -)$, $(\mathbb{Q}, \times, 1, \div)$ ($\forall a \in \mathbb{Q}, a \div 0$ is not defined)

$\times: \mathbb{Q} \times \mathbb{Q} \rightarrow \mathbb{Q}$

$\div: \mathbb{Q} \times (\mathbb{Q} \setminus \{0\}) \rightarrow \mathbb{Q}$

* Int. to Formal Language Theory

Language?

meaning (semantic)

a communication vehicle between human.

Thinking habits are governed by the language

a set of ^{he uses} sequence of (alphabet) symbols.

"I go to school"

"אני הולך לביה"ס"

grammars ... syntactic category

* 한글 글 $\Sigma = \{H, \dots, \theta, t, \dots, l, \dots, \pi\}$

나 $\frac{2}{07, 07}$

29 $\frac{1}{2}$

H.H. $\frac{1}{1} = 1$
33 $\frac{1}{2}$

x $\frac{2}{24}$
최 $\frac{1}{1}$ chae
x $\frac{2}{24}$
최 $\frac{1}{1}$ choi

~~이~~ $\hookrightarrow \subseteq \Sigma^*$

\uparrow
 $1.1192 = 19 \times 21 \times 28$

$\mathcal{V} = \{t, \dots, l\}$

$\mathcal{V}' = \{0, -, 1\}$ \forall 사람 Samsung.

(theory)
 $\left[\begin{array}{l} 0 | \Sigma \rightarrow \text{장난감 (toy)} \\ \text{이} | \Sigma \rightarrow \text{실제} \\ \text{(practice)} \end{array} \right.$

