제 4강 Algebraic System

Set isomorphism

$A \xleftrightarrow{f} B$, $A \cong B$

Let $A \cong_f B$. Then $\forall a \in A$, $f(a) \in B$

$\forall b \in B$, $f^{-1}(b) \in A$

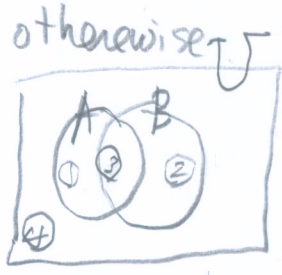
Ex) 대한민국 국민의 집합 $\cong_f$ 주민등록번호의 집합

Consider two set A and B

i) $A \subseteq B$ — $A = B$
$A \subsetneq B$

ii) $A \cap B = \emptyset$

iii) otherwise

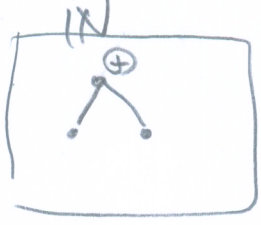


algebraic System

$(M, \circ)$

$\circ : M \times M \to M$ (TP A는 특성을)

closed.



$(\mathbb{N}, +)$

infinite

(B) $0 \in \mathbb{N}$

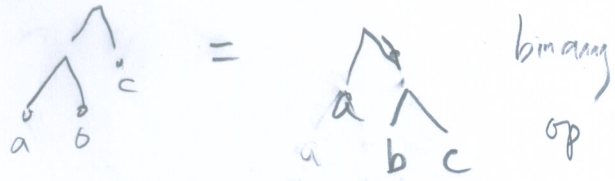
(R) $n \in \mathbb{N} \Rightarrow n{+}{+} \in \mathbb{N}$ $(n+1 \in \mathbb{N})$

비연역의 탈을 쓴, 완벽한 연역논리

finite rep. of Infinite Numbers

② semigroup.

If $\circ$ is associative.



n-ary op

$\sum_{i=1}^{n}$, $\bigcup_{i=1}^{n}$

$\sum_{i \in \{1,2,\cdots,n\}}$ $\sum_{i \in \mathbb{N}_{1,n}}$

$\mathbb{N}_n$

③ Monoid

$(M, \cdot, e)$ $\to$ $\forall x \in M$,

$x \cdot e = e \cdot x = x$

ex) $(V^*, \cdot, \epsilon)$ is a free monoid, $V^* = \bigcup V^n$

rooted tree

$T = (V, E, r)$

i) V is a set of vertices.

ii) $E \subseteq V \times V$

iii) $r \in V$ is a root vertex.

recursive def of R.T

B) $(\{r\}, \emptyset, r)$ is a R.T.

R) Let $T_1 = (V_1, E_1, r_1)$ ... (V_n, E_n, r_n) be RTs. $n \in \mathbb{N}$

$T_2 = (V_2, E_2, r_2)$

Then $\left(\bigcup_{i=1}^{n} V_i \cup \{r\}, \bigcup_{i=1}^{n} E_i \cup \{(r, r_i) \mid 1 \le i \le n\}, r\right)$ is a R.T. (new)