1

제23강 μ-recursive ftn & Turing Church's Thesis 12/4 목

1

① $(A, \oplus)$ is an algebraic system, if
대수 체계
$\forall a, b \in A$, $a \oplus b \in A$ closed.
binary operator

Ex) $(\mathbb{N}, +)$, $(\mathbb{I}, -)$, $(\mathbb{I}, \times)$, $\cancel{(\mathbb{I}, \div)}$?, $(\mathbb{R}-\{0\}, /)$, $\mathbb{R}, +, -, \times, \div, \sqrt{\ }, \ln$

$\frac{df(x)}{dx}$ $\int f(x)dx$

$(\mathbb{N}, +)$

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$a+b=b+a$

$a+(b+c)=(a+b)+c$ *

P.T $(N \cup \Sigma, P)$
AST $(N' \cup \Sigma', P')$
where $N' \subseteq N$, $\Sigma' \subseteq \Sigma$
$P' \subseteq P$

② $(A, \oplus)$ is an semigroup, if
1. $\oplus$ is closed (= $(A, +)$ is an algebraic system)
2. $a \oplus (b \oplus c) = (a \oplus b) \oplus c$ $\oplus$ is associative.
= $\oplus$ - n-ary oper. $n \in \mathbb{N}$.

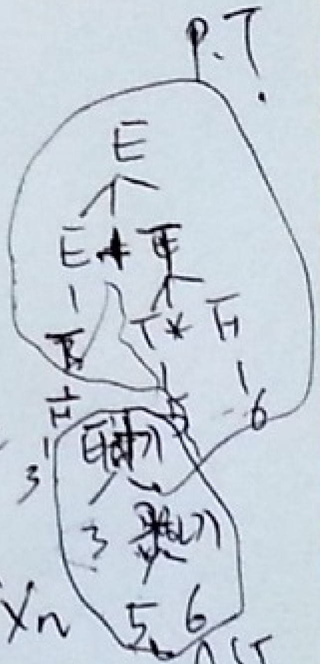
$\sum_{i=1}^{100} i$ $\quad +_{i=1}^{100} i$ → 100-ary prefix operator

$1+2+3+\cdots+100$ infix binary oper.

$+_{i \in \{1,2,\ldots,100\}}$ Indexed set

$\bigcup_{i \in A} X^i$

P.T



parse tree

AST

③ $(A, \oplus, e)$ is an monoid, if
1. $(A, +)$ is an semigroup.
2. e is an identity $\ni$. $\forall a \in A$
(항등원)
$a \oplus e = e \oplus a = a$

$(a|b)^* abb$

lex & yacc
L type 3 r.e(rg)
L type 2 cfg.

$(\mathbb{N}, +, 0)$ is an monoid.
$(\mathbb{N}, \times, 1)$ " " .
$(\Sigma^*, \cdot, \varepsilon)$ " " "
free
Σ.. a set of symbols
string whose length is 1.

*

$\forall x, y \in \Sigma^*$ $x \cdot y \in \Sigma$
$(x \cdot y) \cdot z = x \cdot (y \cdot z)$
$x \cdot \varepsilon = \varepsilon \cdot x = x$

$\times$ yacc
$\$\$ = \$1 \$2 \cdots \$n$
$A \to X_1 X_2 \cdots X_n$

3)
Minimization
Define

$f: \mathbb{N}^n \to \mathbb{N}$ from $g\ \mathbb{N}^{n+1} \to \mathbb{N}$ by

$$f(\vec{x}) = \mu y [g(\vec{x}, y) = 0].$$

μ-Recursive (partial) functions
is Turing computable

μ-RFs $\to$ TM Thm 4.2 — easy

TM $\to$ μRFs Thm 4.3