

1 Определение грамматики

1. $\Sigma = \{[a - zA - Z], \cdot, \backslash, let, =, (,), \backslash n\}$
2. $N = \{application, definition, defname, term, lambda - abstraction, variable, input\}$
3. $S = input$
4. $P :$
 - 1) $\langle definition \rangle ::= let \langle termname \rangle = \langle term \rangle .$
 - 2) $\langle defname \rangle ::= A|B|...|Z.$
 - 3) $\langle term \rangle ::= \langle application \rangle | (\langle term \rangle) | \langle lambda - abstraction \rangle | \langle variable \rangle | \langle defname \rangle$
 - 4) $\langle variable \rangle ::= a|b|...|z$
 - 5) $\langle lambda - abstraction \rangle = \backslash \langle variable \rangle \{ \langle variable \rangle \} . \langle term \rangle$
 - 6) $\langle application \rangle = \langle term \rangle \langle term \rangle$
 - 7) $\langle input \rangle = \{ \langle definition \rangle \backslash n \} \langle term \rangle .$

2 Пример

```
let S = \ x y z . x z (y z)
let K = \ x y . x
S K K
```

$\langle input \rangle \Rightarrow \langle definition \rangle \backslash n \{ \langle definition \rangle \backslash n \} \langle term \rangle \Rightarrow$

Первое *definition*:

- $$\begin{aligned}
 & \langle \text{definition} \rangle \Rightarrow (1) \\
 & \text{let } \langle \text{termname} \rangle = \langle \text{term} \rangle \Rightarrow (2) \\
 & \text{let } S = \langle \text{term} \rangle \Rightarrow (3) \\
 & \text{let } S = \langle \text{lambda} - \text{abstraction} \rangle \Rightarrow (4) \\
 & \text{let } S = \backslash \langle \text{variable} \rangle \{ \langle \text{variable} \rangle \}. \langle \text{term} \rangle \Rightarrow (5) \\
 & \text{let } S = \backslash \langle \text{variable} \rangle \langle \text{variable} \rangle \langle \text{variable} \rangle . \langle \text{term} \rangle \Rightarrow (6) \\
 & \text{let } S = \backslash x \langle \text{variable} \rangle \langle \text{variable} \rangle . \langle \text{term} \rangle \Rightarrow (7) \\
 & \text{let } S = \backslash xy \langle \text{variable} \rangle . \langle \text{term} \rangle \Rightarrow (8) \\
 & \text{let } S = \backslash xyz. \langle \text{term} \rangle \Rightarrow (9) \\
 & \text{let } S = \backslash xyz. \langle \text{application} \rangle \Rightarrow (10) \\
 & \text{let } S = \backslash xyz. \langle \text{term} \rangle \langle \text{term} \rangle \Rightarrow (11) \\
 & \text{let } S = \backslash xyz. \langle \text{application} \rangle \langle \text{term} \rangle \Rightarrow (12) \\
 & \text{let } S = \backslash xyz. \langle \text{term} \rangle \langle \text{term} \rangle \langle \text{term} \rangle \Rightarrow (13) \\
 & \text{let } S = \backslash xyz. \langle \text{variable} \rangle \langle \text{term} \rangle \langle \text{term} \rangle \Rightarrow (14) \\
 & \text{let } S = \backslash xyz.x \langle \text{term} \rangle \langle \text{term} \rangle \Rightarrow (15) \\
 & \text{let } S = \backslash xyz.x \langle \text{variable} \rangle \langle \text{term} \rangle \Rightarrow (16) \\
 & \text{let } S = \backslash xyz.xz \langle \text{term} \rangle \Rightarrow (17) \\
 & \text{let } S = \backslash xyz.xz(\langle \text{term} \rangle) \Rightarrow (18) \\
 & \text{let } S = \backslash xyz.xz(\langle \text{application} \rangle) \Rightarrow (19) \\
 & \text{let } S = \backslash xyz.xz(\langle \text{term} \rangle \langle \text{term} \rangle) \Rightarrow (20) \\
 & \text{let } S = \backslash xyz.xz(\langle \text{variable} \rangle \langle \text{term} \rangle) \Rightarrow (21) \\
 & \text{let } S = \backslash xyz.xz(y \langle \text{term} \rangle) \Rightarrow (22) \\
 & \text{let } S = \backslash xyz.xz(yz) \Rightarrow (23)
 \end{aligned}$$

Итого:

let S = \ x y z.x z (y z)

Второе *definition*:

$$\langle \text{definition} \rangle \Rightarrow \quad (24)$$

$$\text{let } \langle \text{termname} \rangle = \langle \text{term} \rangle \Rightarrow \quad (25)$$

$$\text{let } K = \langle \text{term} \rangle \Rightarrow \quad (26)$$

$$\text{let } K = \langle \text{lambda} - \text{abstraction} \rangle \Rightarrow \quad (27)$$

$$\text{let } K = \backslash \langle \text{variable} \rangle \{ \langle \text{variable} \rangle \}. \langle \text{term} \rangle \Rightarrow \quad (28)$$

$$\text{let } K = \backslash \langle \text{variable} \rangle \langle \text{variable} \rangle . \langle \text{term} \rangle \Rightarrow \quad (29)$$

$$\text{let } K = \backslash x \langle \text{variable} \rangle . \langle \text{term} \rangle \Rightarrow \quad (30)$$

$$\text{let } K = \backslash xy. \langle \text{term} \rangle \Rightarrow \quad (31)$$

$$\text{let } K = \backslash xyz. \langle \text{variable} \rangle \Rightarrow \quad (32)$$

$$\text{let } K = \backslash xyz.x \Rightarrow \quad (33)$$

Итого:

```
let S = \ x y z.x z (y z)
let K = \ x y.x
```

term:

$$\langle \text{term} \rangle \Rightarrow \quad (34)$$

$$\langle \text{application} \rangle \Rightarrow \quad (35)$$

$$\langle \text{term} \rangle \langle \text{term} \rangle \Rightarrow \quad (36)$$

$$\langle \text{application} \rangle \langle \text{term} \rangle \Rightarrow \quad (37)$$

$$\langle \text{term} \rangle \langle \text{term} \rangle \langle \text{term} \rangle \Rightarrow \quad (38)$$

$$\langle \text{defname} \rangle \langle \text{defname} \rangle \langle \text{defname} \rangle \Rightarrow \quad (39)$$

$$SKK \Rightarrow \quad (40)$$

Итого:

```
let S = \ x y z.x z (y z)
let K = \ x y.x
S K K
```