

$\lambda x y = (\text{head } x, \text{head } y) : \lambda (\text{tail } x) (\text{tail } y)$

o functie $f(x, y)$; x, y sunt listi

$f = \lambda x y \rightarrow (\text{head } x, \text{head } y)$

este lambda de x y const. alio \uparrow de este expr 1)

expr 2 e $(\text{head } x, \text{head } y)$

$: \text{cons} = \text{expr 3}$

$f (\text{tail } x) (\text{tail } y) = \text{expr 4} (f \text{ aplicat pe } \dots)$

pt expr 1) tipul: daca x e de tipul a si y e de tipul b si expr 3) e de tipul c

$\Rightarrow f$ e de tipul $a \rightarrow b \rightarrow c$; $x :: a$ $y :: b$ $\Rightarrow f :: a \rightarrow b \rightarrow c$

(1): $\text{head } x \Rightarrow x \text{ lista} \Rightarrow x :: [d]$ (3) $y :: [e]$ (2) $:: (d, e)$
 $\Rightarrow f$ e pe 2 elem, nu pe lista

(4) tot lista de tipul $d, e \Rightarrow \text{dim expr 4} \Rightarrow f :: [d] \rightarrow [e] \rightarrow c$ (4) $:: c$

(3) $\Rightarrow \text{cons} \Rightarrow$ o lista nu e un f tb ss f e lista de cu ea 20 pte ss for cons
 Insa si nu putem din lista tb ss f e tipul expr 2 deci f e cons \Rightarrow

$\Rightarrow (3) : c = [(d, e)]$ f e pe 2 elem

$\Rightarrow f :: [d] \rightarrow [e] \rightarrow [(d, e)]$ f e pe 2 elem

primul x, y de deosebi f pe pareri de x, y f const \Rightarrow λ e pe f pe x si y
 \rightarrow semantica cu zip din Haskell sau zeu cu const parca

$f x y = \text{if } (x == \text{head } y) \text{ then } (x) \text{ else } f x (\text{tail } y)$
 \rightarrow e un fel de filter

cond e $x == \text{head } y \Rightarrow y$ e lista

$\Rightarrow \rightarrow$ a doua tip?? sau depinde de ce e f e fz ?

$\left\{ \begin{array}{l} x :: a \\ y :: [b] \text{ dar } \text{head } y == x \Rightarrow b = a \Rightarrow y :: [a] \\ \text{int } [x] \Rightarrow [a] \end{array} \right.$

$f :: Fz a \Rightarrow a \rightarrow [a] \rightarrow [a]$

2019- a $\neq x \quad y = x \quad y (y \quad x)$

nein wir so 12 def ist 1

$\varphi \times \psi: \text{hom}_{\mathcal{A}}(x, y) \rightarrow \varphi(x) \times \psi(y) \rightarrow \varphi(y)$

$$x :: a, y :: b, (y \ x) :: c \quad = \boxed{c = b}$$

$$\frac{x :: d \quad y :: g \rightarrow b}{(x \ y) :: e}$$

$$\frac{a :: b \quad y :: b}{x \ y :: a \rightarrow b}$$

$$| \overline{a \Rightarrow b} = e |$$

$$y \text{ per } x: \frac{y :: \bar{a} - j \quad x :: k - 1}{(y \times) :: j}$$

$$x \cdot y \text{ ad } f(x) : \frac{(xy) \therefore m-1 \sim (yx) \therefore 0-p}{(xy)(yx) \therefore m}$$

$$xy \ (y \ x) ::= n \quad f ::= a \rightarrow b \rightarrow n$$

$$\text{big-b } f = \text{map } (++)$$

$$\text{map } f : L \rightarrow L' \Rightarrow \text{map} :: (a \rightarrow b) \rightarrow [a] \rightarrow [b] \quad (1)$$

$$(+ +) : \quad L_1 + L_2 \rightarrow L_3 \Rightarrow (+ +) :: \underbrace{[c]}_{L_1} \rightarrow \underbrace{[c]}_{L_2} \rightarrow \underbrace{[c]}_{L_3 = L_1 \cup L_2} \quad (2)$$

cos unific(1) cu (2) trebuie să găsească un nou

$$\text{rule: } (a \rightarrow b) \rightarrow (a \rightarrow b)$$

def \hookrightarrow $(++): [c] \rightarrow [c] \rightarrow [c] \Rightarrow a = [c]$

$$b = [c] \rightarrow [c]$$

$$\Rightarrow f :: [C_c] \rightarrow [C_c \rightarrow C_c]$$

$\text{map}(f, l) \rightarrow$ listă ce apare din lista din lista \Rightarrow primete

listo de liste d'urgence tot o listo de liste.

2018-a

$$f \ x \ y \ z = x \ y \cdot z = z \text{ compute } x \cdot y$$

$x :: a$ $\text{don } xy \text{ e fct \& } z \text{ e functie}$

$y :: b$

$z :: c \equiv d \rightarrow e$

$xy :: f \rightarrow h$

$\text{don } z \circ (xy) \Rightarrow e = g$

$\Rightarrow x :: b \rightarrow e \rightarrow h = a$

$z :: d \rightarrow e$

don

$z(xy(x...))$

$$f :: (b \rightarrow e \rightarrow h) \rightarrow b \rightarrow (d \rightarrow e) \rightarrow d \rightarrow h$$

$$\underline{d \rightarrow e \rightarrow e \rightarrow h}$$

2018-b

$$f \ x \ y \ z = x \cdot y \ z$$

pentru input:

$x :: a ; y :: b ; z :: c ;$

meu uit sa vad ce exist siut : x tb sa fie fct, de fel ca $y \ z$ ca sa fie compute \Rightarrow

$$\Rightarrow x :: d \rightarrow e \stackrel{a}{=} ; \boxed{y \ z :: f \rightarrow h} \Rightarrow \boxed{y :: c \rightarrow g \rightarrow h} = b$$

$\text{don } y :: b$

$\boxed{z :: c}$

$$x \cdot y \ z \Rightarrow x \circ y \ z \Rightarrow x(yz(...))$$

$$\Downarrow x :: h \rightarrow e$$

$$f :: (h \rightarrow e) \rightarrow (c \rightarrow g \rightarrow h) \rightarrow c \rightarrow g \rightarrow e$$

$$g \rightarrow h \rightarrow h \rightarrow e$$

$$2018-a \quad f \ x \ y = (y \ x) \ x$$

$x :: a , y :: b$

$$(y \ x) \Rightarrow y \text{ e fct} \Rightarrow y :: c \rightarrow d \equiv b$$

y e print pe x , dar si $y \ x$ e fct

$$(y \ x) :: c \rightarrow d$$

$$(y \ x) :: a \rightarrow d$$

$$\Downarrow y \text{ e comp } x, x :: a$$

$$y :: a \rightarrow a \rightarrow d$$

$$(y \ x) \ x \neq d$$

$$x :: a , y :: a \rightarrow a \rightarrow d ; uz :: d \Rightarrow$$

$$\Rightarrow f :: a \rightarrow (a \rightarrow a \rightarrow d) \rightarrow d$$

$$\text{W16-b } f \circ x = x (y \circ x)$$

$$\text{gen: } f :: a \rightarrow b \rightarrow c.$$

\underbrace{a}_x
 \underbrace{b}_y
 $\underbrace{c}_{\text{rez}}$

$$x \text{ e func } \text{se aplică } (y \circ x) \Rightarrow x :: d \rightarrow e.$$

$$y \text{ e o func } \text{se aplică pe } x \Rightarrow y :: f \rightarrow h$$

$$x \text{ peste } (y \circ x) \Rightarrow x \text{ primește ca } y \Rightarrow x :: h \Rightarrow d = h.$$

$$y \text{ este } x \Rightarrow y \text{ primește ca } x \Rightarrow y :: e \rightarrow h \Rightarrow g = e$$

$$x :: h \rightarrow e ; y :: e \rightarrow h$$

$$\text{dec: } f :: a \rightarrow b \rightarrow c$$

$$x :: d \rightarrow e \quad d = h \text{ (x ia val int de y)}$$

$$y :: g \rightarrow h \quad e = c \text{ (f ia val int de x)}$$

$$f :: \underbrace{(d \rightarrow e)}_a \rightarrow \underbrace{(g \rightarrow h)}_b \rightarrow c \quad a = g = d \rightarrow e \text{ (y ia func de x)}$$

$$b = g \rightarrow h \equiv g \rightarrow d \Rightarrow b = (d \rightarrow e) \rightarrow d$$

$$\forall b \text{ oarec ex div } f \text{ are } \Rightarrow \underline{d \rightarrow e}.$$

W15-a

$$f \circ x = f (f \circ x) \quad \rightarrow \text{e un fel de compus.}$$

$$f :: a$$

$$f \text{ e func } \Rightarrow f :: e \rightarrow d$$

$$x :: b$$

$$f \text{ primește ca } x \Rightarrow x :: e$$

$$f \text{ se poate aplica pe val int } f \circ x \Rightarrow f :: e \rightarrow e$$

$$x :: e ; f :: e \rightarrow e.$$

$$\text{sol: } f :: a \rightarrow b$$

$$\frac{x :: a \quad (f \circ (f \circ x)) :: b}{(f \circ (f \circ x)) :: b} \quad \text{inducție mai pp}$$

$$f :: c \rightarrow d$$

$$(f \circ x) :: c$$

$$d = b$$

$$f :: e \rightarrow g$$

$$x :: e = a$$

$$g = c$$

$$\text{din } f :: a \rightarrow c = e, b = d = g.$$

$$f :: a \rightarrow a \quad f :: e \rightarrow e.$$