

Zadanie 3

$(f.g) x = f (g x)$
 $\text{flip } f \ a \ b = f \ b \ a$
 $\text{curry } f \ a \ b = f \ (a, b)$

$\text{flip}(\text{curry } f) = \text{curry}(f.\text{swap})$

Rozwiązanie:

$L = \text{flip}(\text{curry } f) \ a \ b = \text{curry } f \ b \ a = f \ (b,a)$

$P = \text{curry}(f.\text{swap}) \ a \ b = f.\text{swap} \ (a,b) = f \ (\text{swap} \ (a, b))$

Wniosek: $\text{swap} :: (a,b) \rightarrow (b,a)$

Zadanie 5

1. $(f.g)x = f(g x)$
 2. $\text{fst}(x,_) = x$
 3. $\text{snd}(,x) = x$
 4. $\text{pair}(f, g)x = (fx, gx)$
 5. $\text{cross}(f, g) = \text{pair}(f.\text{fst}, g.\text{snd})$
- $\text{cross}(f, g).\text{cross}(h, k) = \text{cross}(f.h, g.k)$

Rozwiązanie :

$L = \text{cross}(f, g).\text{cross}(h, k)x =$
 $= \text{cross}(f, g)(\text{cross}(h, k)x) =$
 $= \text{cross}(f, g)(\text{pair}(h.\text{fst}, k.\text{snd})x) =$
 $= \text{cross}(f, g)(h.\text{fst}x, k.\text{snd}x) =$
 $= \text{pair}(f.\text{fst}, g.\text{snd})(h.\text{fst}x, k.\text{snd}x) =$
 $= f.\text{fst}(h.\text{fst}x, g.\text{snd}x), g.\text{snd}(h.\text{fst}x, g.\text{snd}x) =$
 $= f.h.\text{fst}x, g.k.\text{snd}x =$
 $= \text{pair}(f.h.\text{fst}, g.k.\text{fst})x =$
 $= \text{cross}(f.h, g.k)x$

Zadanie 6

class Enum a where
fromEnum:: a -> Int
toEnum:: Int -> a

Rozwiązanie:

Instance Enum (a,b) where

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fromEnum:: (a,b) -> Int
fromEnum a b = fromEnum a + fromEnum b
toEnum:: Int -> (a,b)
toEnum w = (toEnum(w),toEnum(w))
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