

**Aufgabe 1**

Es soll  $\text{sum } (xs ++ ys) = \text{sum } xs + \text{sum } ys$  bewiesen werden.

**Induktionsanfang:**

$$\begin{aligned} \text{sum } ([] ++ ys) &= \text{sum } ys \mid (++) \\ &= 0 + \text{sum } ys \mid (\text{I.V.}) \\ &= \text{sum } [] + \text{sum } ys \mid (\text{sum}) \end{aligned}$$

**Induktionsschritt:**

$$\begin{aligned} \text{sum } ((x:xs) ++ ys) &= \text{sum } (x: (xs ++ ys)) \mid (++) \\ &= x + \text{sum } (xs ++ ys) \mid (\text{sum}) \end{aligned}$$

□

**Aufgabe 2**

Es soll  $\text{take } n \ xs ++ \text{drop } n \ xs = xs$  bewiesen werden.

**Induktionsanfang:**

$$\begin{aligned} \text{take } n \ [] ++ \text{drop } n \ [] &= \\ [] ++ [] &= [] \mid (\text{take}, \text{drop}, []) \end{aligned}$$

**Induktionsschritt:**

$$\begin{aligned} \text{take } n \ (x:xs) ++ \text{drop } n \ (x:xs) &= \\ x : \text{take } (n-1) \ xs ++ \text{drop } n \ (x:xs) &= \mid (\text{take}) \\ x : (\text{take } (n-1) \ xs ++ \text{drop } (n-1) \ xs) &= \mid (\text{drop}) \\ x : (xs) &= x:xs \mid (\text{I.V.}) \end{aligned}$$

□

**Aufgabe 5**

Es soll  $\text{flip}.\text{flip} = \text{id}$  bewiesen werden.

$$\begin{aligned} \text{flip} . \text{flip} &= \text{flip } (\text{flip } f \ x \ y) \mid (\text{flip}) \\ &= \text{flip } (f \ y \ x) \mid (\text{flip}) \\ &= f \ x \ y \mid (\text{flip}) \\ &= \text{id} \end{aligned}$$

□

**Aufgabe 6**

```
module MyPrelude where
import qualified Prelude (length, reverse, foldr)
length :: [a] -> Int
length [] = 0
length (x:xs) = 1 + length xs
reverse :: [a] -> [a]
reverse [] = []
reverse (x:xs) = (reverse xs) ++ x
foldr :: (a -> b -> b) -> b -> [a] -> b
foldr f a [] = a
foldr f a (x:xs) = f x (foldr f a xs)
```