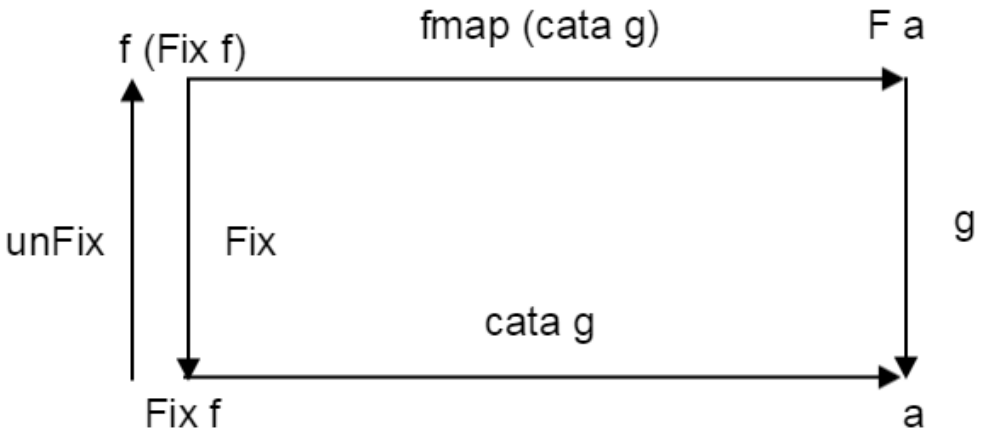
Construction/Déconstruction

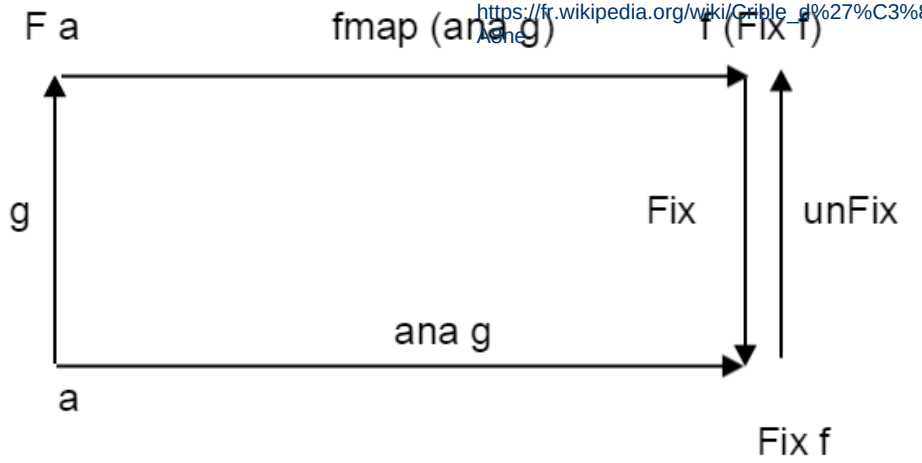
```
{-# LANGUAGE DeriveFunctor #-}
data Fix f = Fx (f (Fix f))
unFix :: Fix f -> f (Fix f)
unFix (Fx x) = x;
data F a = Const Int | Plus a a deriving (Show,
Functor)
calc :: F Int -> Int
calc (Const i) = i
calc (Plus i j) = i + j
cata :: Functor f => (f b -> b) -> Fix f -> b
cata g = g . (fmap (cata g)) . unFix
main=do print $ (cata calc) (Fx (Const 1))
 print $ (cata calc) $ Fx $ (Fx (Const 1))
`Plus` (Fx (Const 1))
```



```haskell
{-# LANGUAGE DeriveFunctor #-}
-- https://bartoszmilewski.com/2017/02/28/f-algebras/
import Prelude
newtype Fix f = Fix (f (Fix f))
unFix :: Fix f -> f (Fix f)
unFix (Fix x) = x
cata :: Functor f => (f a -> a) -> Fix f -> a
cata alg = alg . fmap (cata alg) . unFix;
ana :: Functor f => (a -> f a) -> a -> Fix f
ana coalg = Fix . fmap (ana coalg) . coalg
data StreamF e a = StreamF e a deriving (Functor, Show)
al :: StreamF e [e] -> [e]
al (StreamF e a) = e : a
toListC :: Fix (StreamF e) -> [e]
toListC = cata al
notdiv p n = n `mod` p /= 0
erat :: [Int] -> StreamF Int [Int]
erat (p : ns) = StreamF p (filter (notdiv p) ns)
main = do print $ (toListC . (ana erat)) [2..]
```

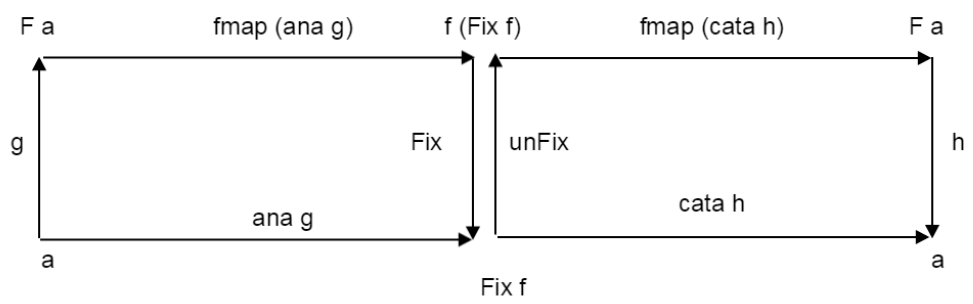
Crible d'Ératosthène

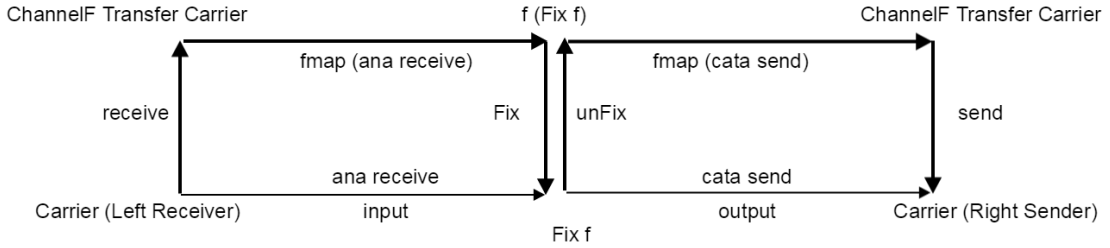
https://fr.wikipedia.org/wiki/Crible_d%27%C3%89ratosth%C3%A8ne



Main.hs	module Main where import Prelude import Data.Ampli.Ampli main = do print $ ampli (Left "h1 e2")
Ampli.hs	{-# LANGUAGE DeriveFunctor #-} module Data.Ampli.Ampli where import Prelude import Data.Ampli.Hylo data StreamF e a = StreamF e a deriving (Functor,Show) data ChannelF e a = NilF | ChannelF e a deriving (Functor, Show) type Carrier = Either Receiver Sender type Transfer = Maybe Int type ConnectorF = ChannelF Transfer type InterfaceF =

```
ConnectorF Carrier
output :: Fix
(ConnectorF) ->
Carrier
input :: Carrier ->
Fix (ConnectorF)
output = cata send
input = ana receive
ampli = (output .
input)
type Receiver = [Char]
type Sender = [Int]
send:: InterfaceF ->
Carrier
receive:: Carrier ->
InterfaceF
send (ChannelF
Nothing (Right p)) =
(Right p)
send (ChannelF (Just
i) (Right p)) =
(Right (i:p))
send (NilF) = (Right
[])
receive (Left []) =
NilF
receive (Left
('e':'1':ns)) =
ChannelF (Just 48)
(Left ns)
receive (Left
('e':'2':ns)) =
ChannelF (Just 49)
(Left ns)
receive (Left (p :
ns)) = ChannelF
(Nothing) (Left ns)
```





Hylo.hs	{-# LANGUAGE DeriveFunctor #-} module Data.Ampli.Hylo where import Prelude data Fix f = Fix (f (Fix f)) instance Show (Fix f) where show (Fix x)= "." unFix :: Fix f -> f (Fix f) unFix (Fix x) = x cata :: Functor f => (f a -> a) -> Fix f -> a cata alg = alg . fmap (cata alg) . unFix; ana :: Functor f => (a -> f a) -> a -> Fix f ana coalg = Fix . fmap (ana coalg) . coalg