第10回 数理科学IIIA 6/28(火)

f' $r \downarrow d$

F

G: Lin → Set　forgetful functor(忘却

Lin: 線型空間の category

Set: 集合の category

集合 X → X を基底とするような線型空間 GX

$f = (Sf')\circ u$

$C \xrightarrow{u} Sr$

d: an object of

f: C → Sd arrow

f: C → Sd

X → F GX　自然な埋め込み

GX　L: 線型空間

g: GX → L

Fg: FGX → FL

f: X → FL

定義　S : D → C functor (D, C は categories)

C: an object of C

<u>universal arrow from c to S</u>　⟨r, u⟩　r: an objec

u: c → Sr arrow in

集合 の category

ϕ : 空集合

initial object (始対象) ϕ → X

X → {*} final object (終対象)

universal arrow

(c ↓ S)　<u>comma category</u>　initial object

d は D の object

object ⟨d, c $\xrightarrow{f}$ Sd⟩

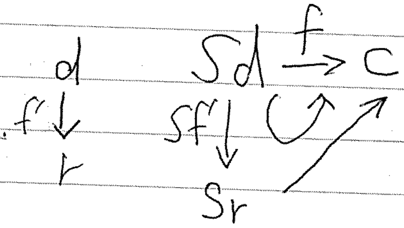
$c \xrightarrow{f} Sd$, $S\varphi$: Sd → Sd', g: c → Sd'

φ: d → d'

dual

universal arrow from c to S
universal arrow from S to c

∃!



2つの category の直積 product $\langle c, d\rangle \xrightarrow{\langle f, g\rangle} \langle c', d'\rangle$

coproduct

categories

$C \times D$ categories $f : c \to c'$

$g : d \to d'$

$\langle c, d\rangle$ c object of C

d object of D

C category

$\Delta : C \longrightarrow C \times C$ diagonal functor

(対角関手)

$\Delta(c) = \langle c, c\rangle$

$\Delta(f) = \langle f, f\rangle$

universal arrow

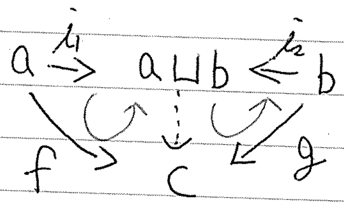
from $\langle a, b\rangle$ to Δ $\langle a, b\rangle$ an object of $C \times C$

coproduct

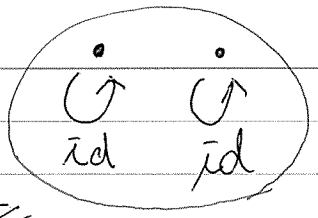
$a \sqcup b$ an object of C

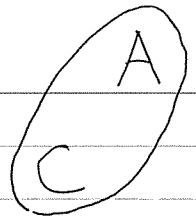
$\langle a, b\rangle \to \Delta(a \sqcup b)$ $\langle a \sqcup b, a \sqcup b\rangle$

$\Delta(c)$



$C \times C$



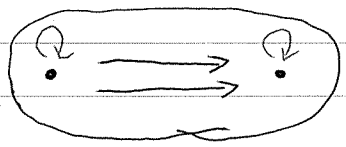


functor category

functor object

$C \times C$ universal arrow from $\langle a, b \rangle$ to $\langle a, b \rangle$

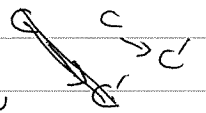
C product



C

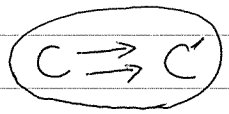
diagonal functor.

$\Delta : C \to C^A$

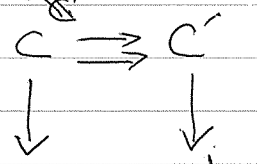


$X \rightrightarrows Y$ $f(x)=$

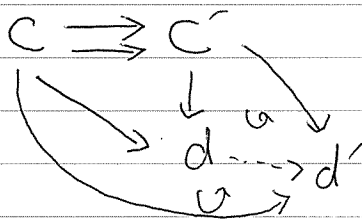
universal arrow



$\to \Delta(d)$

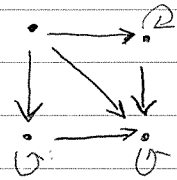


from Δ to $C=$



$\{x \in X \mid f(x) = g(x)\}$

equalizer



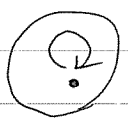
C_1 C universal arrow

$C_3 \Rightarrow C_2$ pullback

general nonsense

Grothendiek

A



$C = C$ terminal object