

2017年度 数理科学III

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monoidal category

monoid

$(x \cdot y) \cdot z = x \cdot (y \cdot z)$ 結合律

M: 集合

• 2項演算

単位元

$e \cdot x = x \cdot e = e$

ex) 集合と写像の Category
自然な形

$(X \times Y) \times Z \cong X \times (Y \times Z)$

bifunctor

$(X, Y) \mapsto X \times Y$
 $Set \times Set \rightarrow Set$

自然

$X \times \{*\} \cong X$

形式的定義

monoidal category

$B = \langle B, \square, e, \lambda, \rho \rangle$

B: category
 $\square = B \times B \rightarrow B$ bifunctor

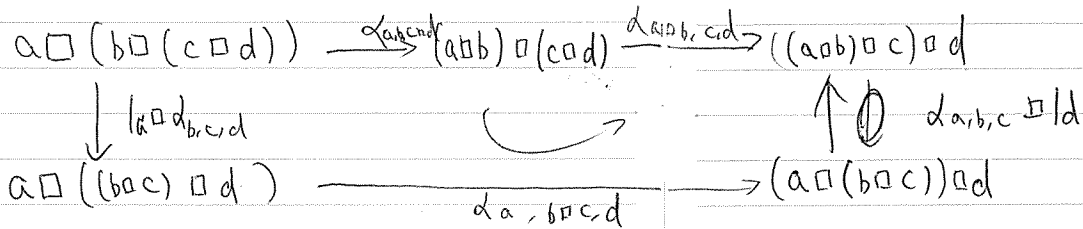
$e \in B$: object

$d = d_{a,b,c} = a \square (b \square c) \cong (a \square b) \square c$
natural isomorphism

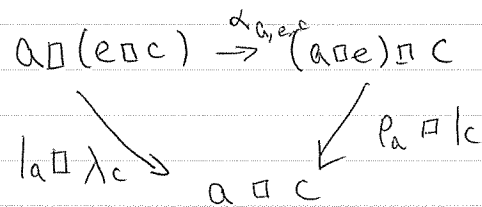
$\lambda_a = e \square a \cong a$

$\rho_a = a \square e \cong a$

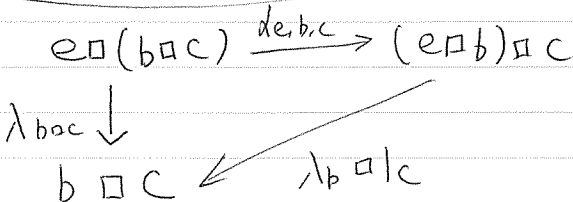
① Pentagon diagram



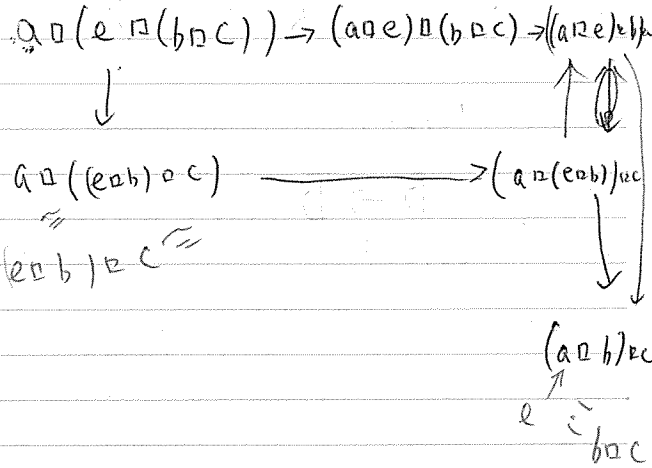
② triangular diagram



③ $\lambda_e = \rho_e : e \square e \rightarrow e$



$e \square (b \square c)$



M 2項

$(a \square b) \square c = a \square (b \square c)$
 $a \square b = b \square a$

