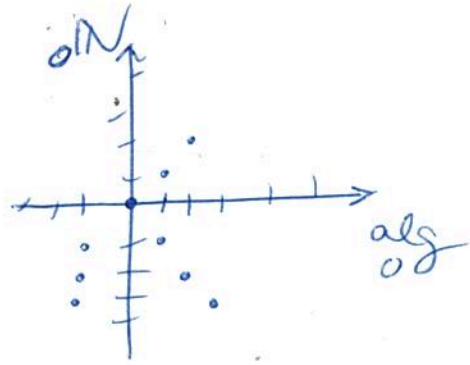
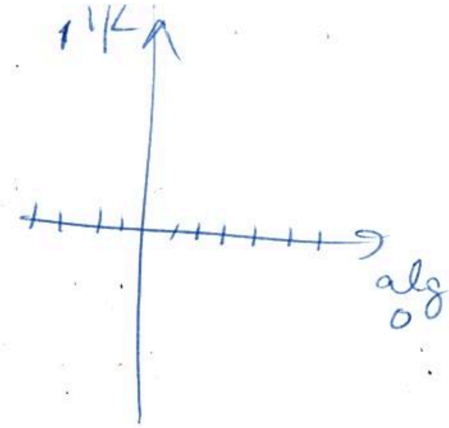




${}_0\mathbb{N} \sim 0,0$

$f: \mathbb{N} \to \mathbb{N}$

$n \in \mathbb{N} \sim (a_n)_{n\in\mathbb{N}}$

$\{-,0,1\} \leftarrow \mathbb{N}$

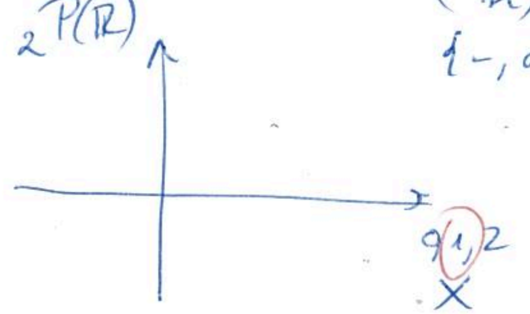
${}_1\mathbb{R} \sim \underset{-1}{1}, 0$

$g: {}_0\mathbb{N} \to {}_1\mathbb{R}$

imersão

$r \in \mathbb{R} \sim (b_n)_{n\in\mathbb{N}}$

$\mathbb{N} \to D$



$B \sim 2, j$

$h: X \to B$

$b \in B \sim (c_\lambda)_{\lambda \in \{\mathbb{N}, \mathbb{R}, B\}} \to D$

$\mathbb{N}$ ~~00~~

~~01~~ 01

$\mathbb{R}$ ~~10~~

$\mathbb{R}^\omega$ ~~11~~

v.a. ~~20~~ ~~02~~ $(B\times\mathbb{R})^T$

B ~~21~~ ~~12~~ $\sim$ $\cancel{B^T}$

22

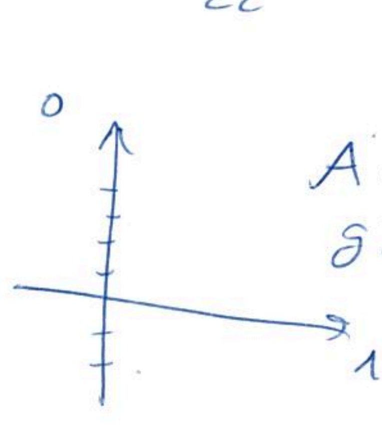
$X' \sim i, j$

$\varphi: {}_iX \to {}_jX$

$v \in X' \sim (\delta_\lambda)$

$\lambda \in {}_iX$

${}_iX \to D$



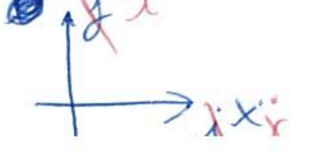
$A \sim 0,1$

$g: \mathbb{R} \to \mathbb{N}$

submersão

$\alpha \in A \sim (d_\lambda)_{\lambda\in\mathbb{R}}$

$\mathbb{R} \to D$



$-1 = [\dots, 0, \dots, \text{"}-\text{"}, 1, 0, \dots]$

$\pi = [\dots, 0, 0, \dots, 3, 1, 4, 1, 5, \dots]$

(2)

$$\begin{array}{ccc} \mathbb{N} & \xrightarrow{d_n} & D \\ {\scriptstyle 0,0}\downarrow f & \searrow^{g^{-1}}_{1,0} & \\ \mathbb{N} & \xleftarrow{\cancel{f\circ g}} & \mathbb{R} \end{array}$$

$$\begin{array}{ccc} {}_iA & \longrightarrow & D \\ \downarrow F & \searrow^{H} & \\ {}_{j=2}B & \xrightarrow{G} & {}_kC \end{array}$$

$$G_{k,j} \circ F_{j,i} = H_{k,i}$$

$\mathbb{N} \in M(0,0) \Rightarrow \mathbb{N}^T \in M(0,0)$

$\mathbb{R} \in M(1,0)$

$\mathbb{R}^T \in M(0,1)$

$B \in M(2,j),\ j=1$

$B^T \in M(i,2),\ i=1$

$\mathbb{R}^n \in M(1,0) \ni \mathbb{C}, \mathbb{H}$

$\mathbb{R}^\omega = \mathbb{R}^{\mathbb{N}}$?

$\mathbb{N}^\omega = \mathbb{N}^{\mathbb{N}} = \mathbb{R} \in M(1,0)$

$\mathbb{Q}^\omega \in M(1,0)$

$X \notin M(0,0) \cup M(k,k-1)$

X é anel $\Leftarrow$?

série sobre os reais

Notação: ${}_i x \in {}_j Y \quad \#Y = \aleph_j$

$\exists$ decomposição $d(x,\lambda)$

λ-ésimo dígito de x $\quad d: {}_jY \times {}_iX \to D$

$\mathbb{N}^n = M(0,0)$

$P^k(\mathbb{N}) \in M(k,k-1) \overset{?}{\Longrightarrow} P^{k+1}(\mathbb{N}) \in M(k+1,k) \quad k \geq 1$

$\overline{\mathbb{N}} = \{[\mathbb{N}]_b ;\ b \in \{2,3,\dots\}\}$

$P^k(\mathbb{N}) \qquad b \in B \quad \begin{array}{l} 2 \mapsto \{0,1\} = D_2 \\ 10 \mapsto \{0,1,\dots,9\} = D_{10} \end{array}$

$$\begin{cases} x = a + tu & ut \\ y = b + tv & vt \end{cases}$$

$t \in P^k(\mathbb{N})$

$(x,y) \in (P^k)^2(\mathbb{N})$

$(P^k)^{n_0}(\mathbb{N})$ versus $(P^k)^\omega(\mathbb{N})$

Teorema Fundamental dos Espaços Objetos Transformadas

classe $C^{n_3} \xrightarrow{n_3 \to \infty} C^\infty$

polinômio $(A[x]_{n_1})^{n_2}$, Whitney

norma, métrica, produto interno

③

$$\# \mathbb{R}^\omega = \#\{g : \mathbb{N} \xrightarrow{1,0} \mathbb{R}\}$$

$$= \#\{g' : \mathbb{N} \times \mathbb{N} \longrightarrow D = \mathbb{Z}_2\}$$

$$= 2^{\#\mathbb{N}} = \#\mathbb{R}$$

$\therefore \mathbb{R}^\omega \in M(1,1)$

$\Gamma g \subset \mathbb{N} \times_1 \mathbb{R}$

$\# g \leq \aleph_1$

$_2\mathbb{B} = P(\mathbb{R}) = P^2(\mathbb{N})$; $\mathbb{R}^{\mathbb{B}} \in M(i, j)$

$$\aleph_i = \#\mathbb{R}^{\mathbb{B}} = \#\{h : \mathbb{B} \xrightarrow{1,2} \mathbb{R}\}$$

$$= \#\{h' : \mathbb{B} \times \mathbb{N} \longrightarrow \mathbb{Z}_2\}$$

$$= 2^{\#\mathbb{B}} = \#P(\mathbb{B}) = \aleph_3$$

$\therefore \mathbb{R}^{\mathbb{B}} \in M(3,2)$

$x \in \mathbb{B},\ y \in \mathbb{R},\ n \in \mathbb{N}$

$X(x) = y$

$X'(x, n) = y_n$

$X : \mathbb{B} \longrightarrow \mathbb{R}$

$X' : \mathbb{B} \times \mathbb{N} \longrightarrow \mathbb{Z}_2$

$\Gamma X \subset \mathbb{B} \times \mathbb{R}$

$\aleph_j = \#X \leq \aleph_2$

$\mathbb{N} \in M(0,0)$

$\mathbb{R} \in M(1,0)$

$\# \mathbb{B} = 2$

$b \in \mathbb{B} \Rightarrow b : \mathbb{R} \to \mathbb{R}$

$\Gamma b \subset \mathbb{R}^2 \Rightarrow \# b \leq \aleph_1$

$\mathbb{B} \in M(2,1)$

$\vdots$

$P^k(\mathbb{N}) \in M(k, k-1)$ *hipótese de indução*

$\# P^{k+1}(\mathbb{N}) = \aleph_{k+1}$

$f \in P^{k+1}(\mathbb{N})$

$f : P^k(\mathbb{N}) \longrightarrow P^k(\mathbb{N})$

$\Gamma f \subset (P^k)^2(\mathbb{N})$

$\# f \leq \aleph_k$

$P^{k+1}(\mathbb{N}) \in M(k+1, k)$ Q.E.D.