$f: \mathbb{R} \to \mathbb{R}$ ##Condizione di Sfera##

$f \in \text{Pari} \Longrightarrow \left(D(f) \cap]-\infty, 0[\right) \neq \left(D(f) \cap]0, +\infty[\right)$

$f \in \text{Dispari} \Longrightarrow$

$\tilde{f} \in \mathbb{F}$

$f: \mathbb{R} \longrightarrow \mathbb{R}$

$\mathbb{N} \quad \mathbb{Z} \quad \mathbb{Q} \quad \mathbb{R} \quad \mathbb{C}$

Fondamenti di Informatica

8,5

+ 8,5 1000,1 3 3+127 130 128+2

0 00010000 0···0100000010

0 00000010 0001···

-127

Numeri subnormalizzati

Complemento a 1

Complemento a base diminuita

$X' = X'' - 1$

x' complemento a uno

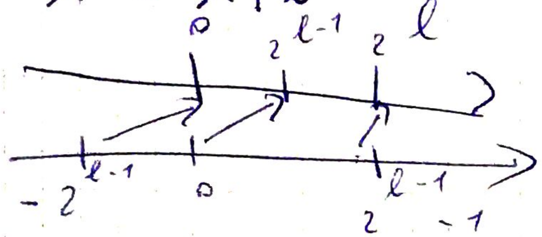
x'' complemento a due

0000

1111 0

Eccesso

$X^e = X + \cancel{b}^{\,l-1}$



1 +

0 −

$K = 2^{l-1}$

0000 → −K

K → 0

Eccesso K

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 ~~16~~

$\begin{cases} K \le 2^m \\ [-K; 2^m - K - 1] \end{cases}$

BASE DIMINUITA	0	1	2	3	4	5	6	7	−7	−6	−5	−4	−3	−2	−1	0
ECCESSO 8	−8	−7	−6	−5	−4	−3	−2	−1	0	1	2	3	4	5	6	7
SEGNO E MODULO	0	1	2	3	4	5	6	7	0	−1	−2	−3	−4	−5	−6	−7

13 10

1101 1010

11110 101

11110110

00001101 +

11110110

100000011

3

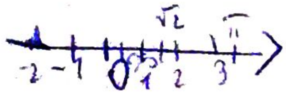
001101

0011

1001

11

7



$\mathbb{R}$

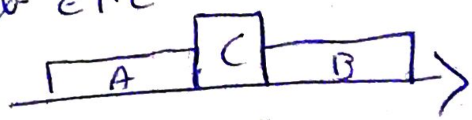
$A \neq \emptyset$ $\quad A \subseteq \mathbb{R}$

$B \neq \emptyset$ $\quad B \subseteq \mathbb{R}$

Separati

$\forall a \in A, \forall b \in B \Rightarrow a \leq b$

$\nexists\, a \in A / a > b \quad \forall b \in \mathbb{R}$



$A = [-3; -1]$ $\quad B = [2; 6]$

A Separato B

Zona di Separazione

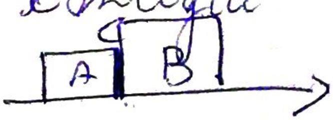
$C = [MAX(A); MIN(B)]$ $\quad C \subseteq \mathbb{R} / \forall a \in A, \forall b \in B /$

$a \leq c \leq b$

$\exists\, C = \emptyset$

$\forall c \in C$

Contigui $\quad$ A Separato B



Elemento di separazione $c \ \forall c \in C$

$|C| = 1$

$\exists!\, c \Rightarrow$ A Contiguo B

c Elemento di Separazione

Completezza

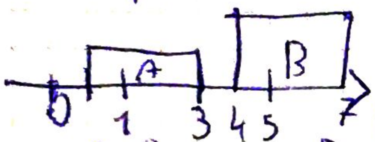
$A \subseteq \mathbb{R}$ $A \neq \emptyset$ $\mathbb{R} \in$ Assioma di Completezza

$B \subseteq \mathbb{R}$ $A \neq \emptyset$ $\mathbb{N}, \mathbb{Z}, \mathbb{Q} \notin$ Assioma di Completezza

A Separato B $\mathbb{Q} \overset{?}{\in}$ Assioma di Completezza

A Separato B $\Longrightarrow \exists c$ Dengra..?

$\mathbb{N}$



$\mathbb{N}$

A Separato B $\mathbb{N}$ $\nexists c$

$\mathbb{Z}$

$\mathbb{Q}$

Assioma di Ordinamento

1. Dicotomia

$\forall a, b, c \in \mathbb{R}$

$\forall (a, b) \in \mathbb{R} \Longrightarrow a \leq b \,||\, b \leq a$

2. Asimmetrica

$\forall (a, b) \in \mathbb{R} \cancel{\Longrightarrow} a \leq b \wedge b \leq a \Longrightarrow a = b$

3. $a \leq b \Longrightarrow a + c \leq b + c$

4. $a \geq 0 \wedge b \geq 0 \Longrightarrow a + b \geq 0 \wedge a \cdot b \geq 0$

$a \le b = b \geq a$

$a \le b \qquad c<0$

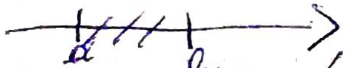
$a \cdot c \not\le b \cdot c$

$a \cdot c \geq b \cdot c$

Topologia della retta

① Insieme

② Intervallo

 Limitato

$\forall x \in \mathbb{R} \,/\, a \le x \le b$

Aperto ~~Chiuso~~ $a < x < b$ $(a;b)$ $]a;b[$

Chiuso $a \le x \le b$ $[a;b]$

$a \le x < b$ $[a;b)$ $[a;b[$

$a < x \le b$ $(a;b]$ $]a;b]$

Illimitato

$\hat{\mathbb{R}} \qquad -\infty, +\infty \in \hat{\mathbb{R}}$

$\mathbb{R} = \hat{\mathbb{R}}$

$(a;+\infty)$ Aperto Inferiormente
Illimitato Superiormente

Intorno

Intorno $(x) :=$ Intervallo $/ x \in$ Intervallo

Intorno $(x) := [a; b] / x \in [a; b]$

$I(x) :=$ Intorno

Intorno Destro $(x) :=$ Intervallo $]x; b[$

Intorno Sinistro $(x) :=]a; x[$

$x \notin I_S(x)$

$x \notin I_D(x)$

Intorno Circolare

$I_C(x) :=]x - r; x + r[$

$\varepsilon \; \delta > 0$

MINIMO

Minimo $(A) = x \in A / \nexists a \in A / a < x$

Massimo $(A) = x \in A / \nexists a \in A / a > x$

$[a; b[$

$\nexists$ Massimo

Minorante Maggiorante

$A \subseteq \mathbb{R}$

$\min(A) := x \,/\, \forall a \in A \quad x \leq a \implies \left]-\infty; \text{MIN}(A)\right]$

$\max(A) := x \,/\, \forall a \in A \quad x \geq a \implies \left[\text{MAX}(A); +\infty\right[$

$A = [a; b] \quad B =]a; b[\implies$ minoranti $(A) =$ minoranti (B)

$\hookrightarrow$ maggioranti $(A) =$ maggioranti (B)

$A \in$ Illimitati Inferiormente $\implies \nexists$ minoranti (A)

$A \in$ Illimitati Superiormente $\implies \nexists$ maggioranti (A)

minorante chiuso superiormente

maggiorante chiuso inferiormente

Estremo Inferiore Estremo Superiore

$A \subseteq \mathbb{R}$

$\inf(A) := \max(\text{minoranti}(A))$

$\sup(A) := \min(\text{maggiorante}(A))$

$A = [a; b[\implies \inf(A) = a \qquad a \in A, \; b \notin A$

$\hookrightarrow \sup(A) = b$

$A =]-\infty; +\infty[$

$\inf(A) = -\infty$

$\sup(A) = +\infty$

$A \subseteq \mathbb{R}$

① $\inf(A) \leq x \ \forall x \in A$

② $\forall \varepsilon > 0 \ \exists x \in A / x < (\inf(A) + \varepsilon)$

① $\sup(A) \geq x \ \forall x \in A$

② $\forall \varepsilon > 0 \ \exists x \in A / x > (\sup(A) - \varepsilon)$

Accumulazione di un punto

$A \subseteq \mathbb{R}$

$x_0 \in \text{Accumulazione}(A) \Longleftarrow \forall I(x_0) \ni a \ \forall a \in A / a \neq x_0$

$x_0 \in A \subseteq \mathbb{R}$

$a \in I_r(x_0) \ \forall a \in A, a \neq 0 \ \forall r > 0$

$A = (a; b) \qquad a \notin A$

$a \in \text{Accumulazione}(A)$

$A = \{a\}$

$a \notin \text{Accumulazione}(A)$

$a \in \text{Punto Isolato}(A)$

$A \subseteq \mathbb{R}$

$\text{Derivato}(A) := x \ \forall x \in \text{Punti di Accumulazione}(A)$

$A = (a; b)$

$\text{Derivato}(A) = [a; b]$

$-\infty \in \text{Derivato}(A) \Leftarrow A =]-\infty; a]$

$+\infty \in \text{Derivato}(A) \Leftarrow A = [a; +\infty[$

$\mathbb{N}$

$+\infty \in \text{Derivato}(\mathbb{N})$

$\text{Derivato}(\mathbb{N}) = \{+\infty\}$

Fattoriale

$n! \qquad n \in \mathbb{N}$

$n! = n \cdot (n-1) \cdot (n-2) \cdots 1 = n \cdot (n-1)! = n \cdot (n-1) \cdot (n-2)!$

$0! = 1$

$1! = 1$

$\binom{n}{k} = \dfrac{n!}{k!(n-k)!}$ Coefficente Binomiale

$n, k \in \mathbb{N} \quad n \geq k \geq 0$