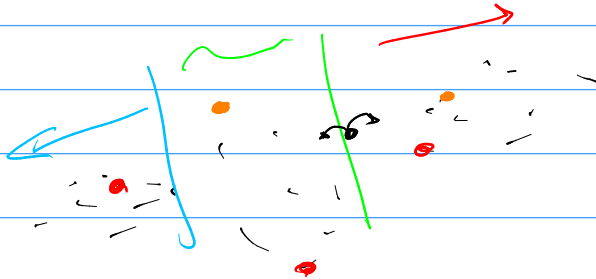


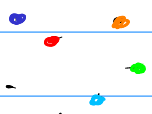
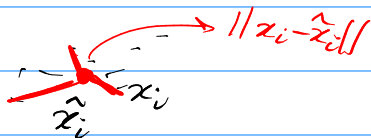
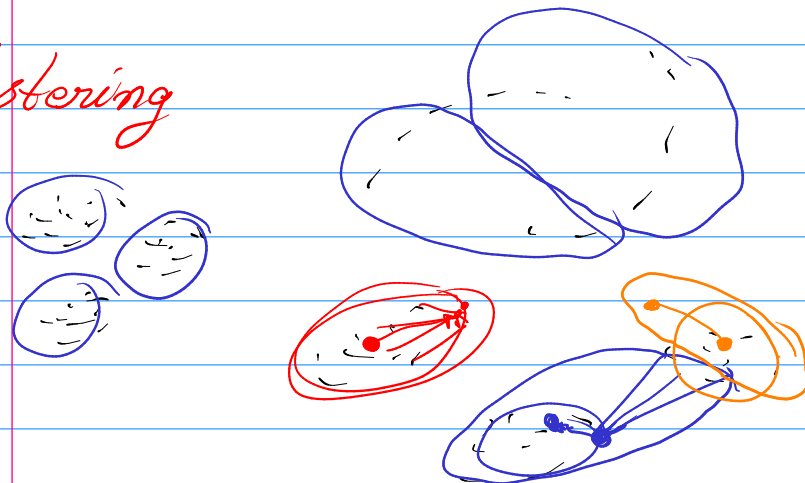
Prob. 1 $N\left(\begin{pmatrix} 3 \\ 3 \end{pmatrix}, \begin{pmatrix} 1 & 0.7 \\ 0.7 & 1 \end{pmatrix}\right)$

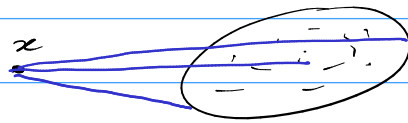
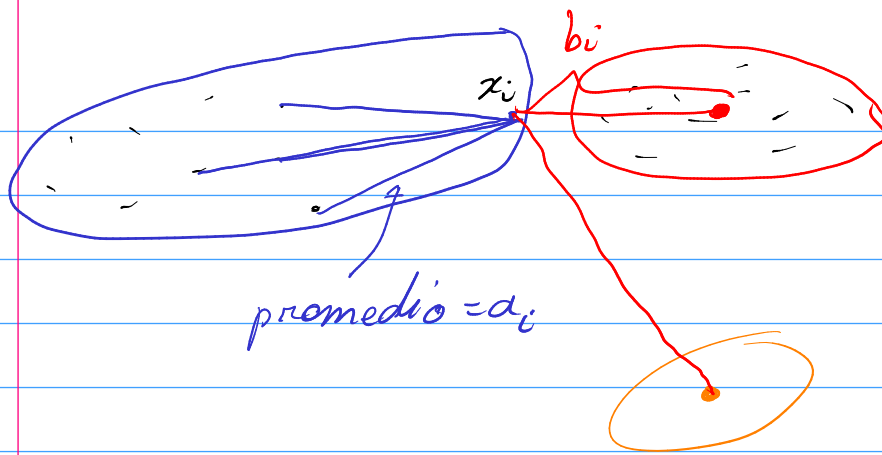
Prob. 2 $N\left(\begin{pmatrix} 6 \\ 4.5 \end{pmatrix}, \begin{pmatrix} 1 & -0.7 \\ -0.7 & 1 \end{pmatrix}\right)$

Prob. 3 $N\left(\begin{pmatrix} 9 \\ 6 \end{pmatrix}, \begin{pmatrix} 1 & 0.7 \\ 0.7 & 1 \end{pmatrix}\right)$

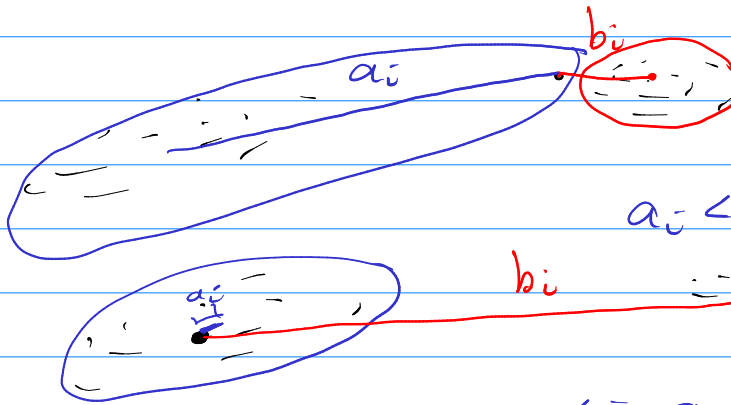


Clustering



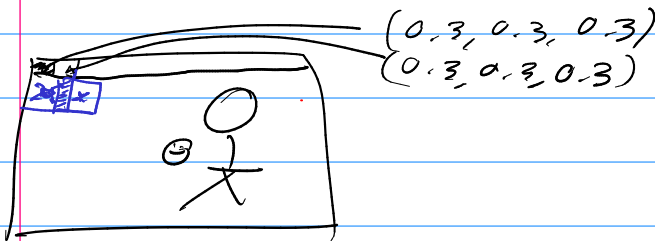
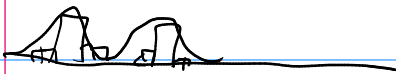


$b_i < a_i \Rightarrow$ mal clasificado



$a_i \ll b_i \Rightarrow$ buena clasificación

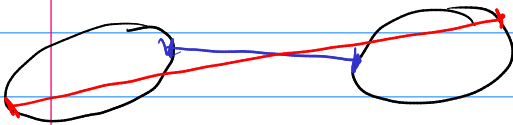
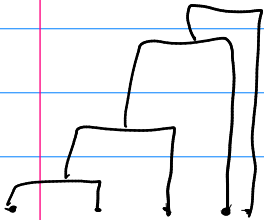
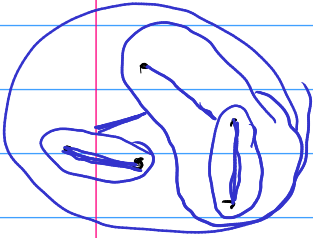
si $a_i \sim b_i$



Clustering Jerárquico

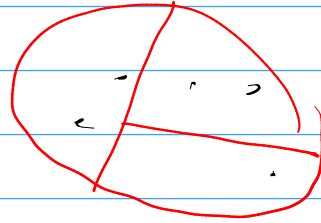
Agglomerative
additive

* Comienzas de
abajo hacia arriba



Divisive

* Comienzas arriba hacia
abajo



Estos métodos requieren una medida de disimilitud
entre grupos.

Ejemplo

id	X
1	10
2	7
3	28
4	20
5	35

$$d(G, H) = |x_G - x_H|$$

x_G, x_H : representantes del grupo

$$x_G = \max\{x: x \in G\}$$

Matriz de
disimilitud

Gpo.	1	2	3	4	5
1	0	3	18	10	25
2		0	21	13	28
3			0	8	7
4				0	15
5					0

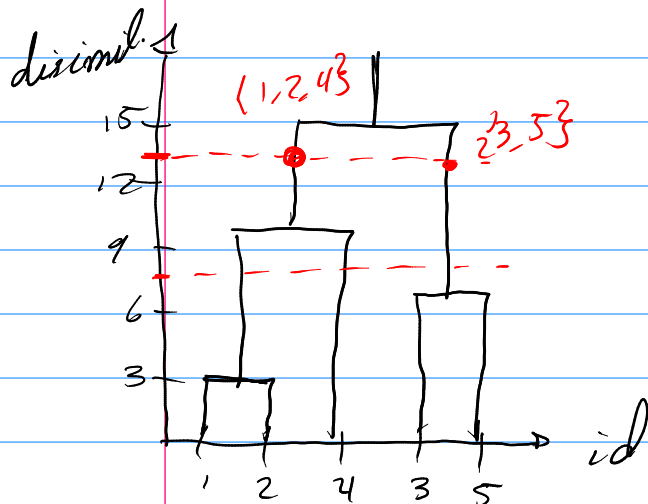
$\{1,2\}$ es nuestro nuevo cluster

Gpo.	$\{1,2\}$	$\{3\}$	$\{4\}$	$\{5\}$
$\{1,2\}$	0	18	10	25
3		0	8	7
4			0	15
5				0

$\{3,5\}$ es el nuevo cluster.

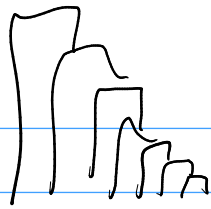
Gpo.	$\{1,2\}$	$\{3,5\}$	4
$\{1,2\}$	0	25	10
$\{3,5\}$		0	15
4			0

Gpo.	$\{1,2,4\}$	$\{3,5\}$
$\{1,2,4\}$	0	15
$\{3,5\}$		0



3, 7, 10, 15

~~$\{1,2,4\}$~~ ~~$\{3,5\}$~~ } 5 cluster

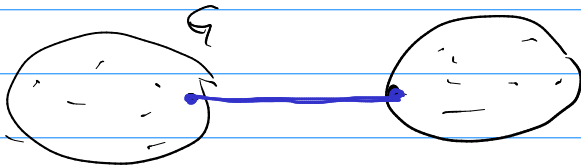


(X, Y)

$p(1-p)$
 $p \log p$

single Linkage / nearest neighbor

$$d_{sl}(G, H) = \min_{\substack{i \in G \\ i' \in H}} d(i, i')$$



distancias

id	X	Gpo.	{1, 2}	3	4	5	3
1	10	{1, 2}	0	18	10	25	
2	7						
3	28	3		0	8	7	
4	20	4			0	15	
5	35	5				0	

$$d(\{1, 2\}, \{3\}) = \min_{\substack{i \in G \\ i' \in H}} d(i, i')$$

$$d_{13} = 18$$

$$d_{23} = 21$$

$$= \min \{18, 21\}$$

Gpo.	{1, 2}	{3, 5}	4
{1, 2}	0	18	10
{3, 5}		0	8
4			0

Gpo. $\{1, 2\}$ $\{3, 4, 5\}$
 $\{1, 2\}$ 0
 $\{3, 4, 5\}$ 10
 0

