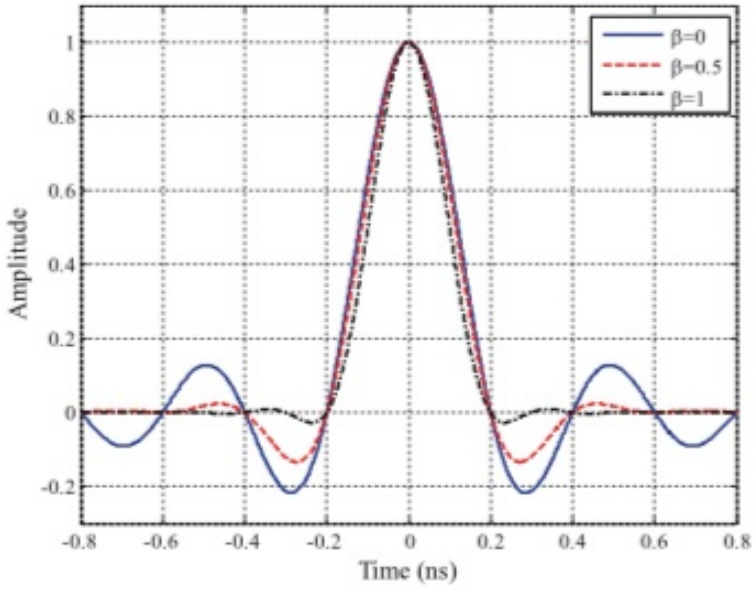
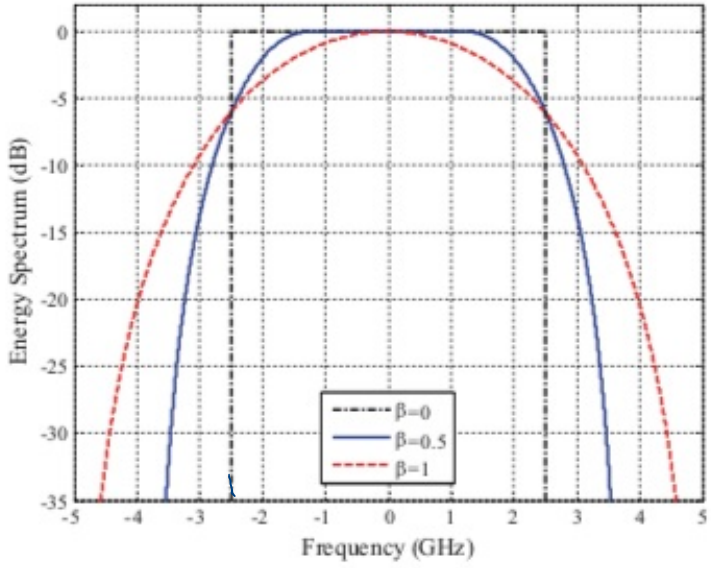
Medición de Tiempos

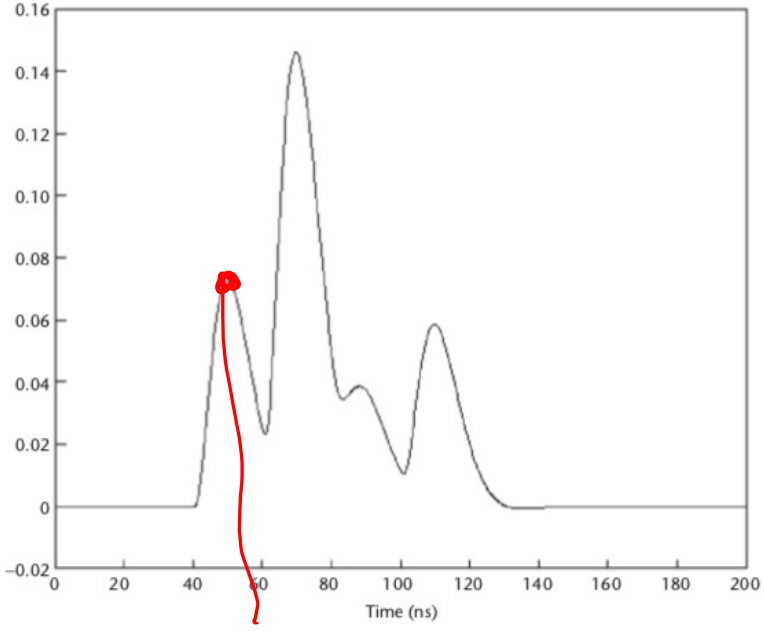


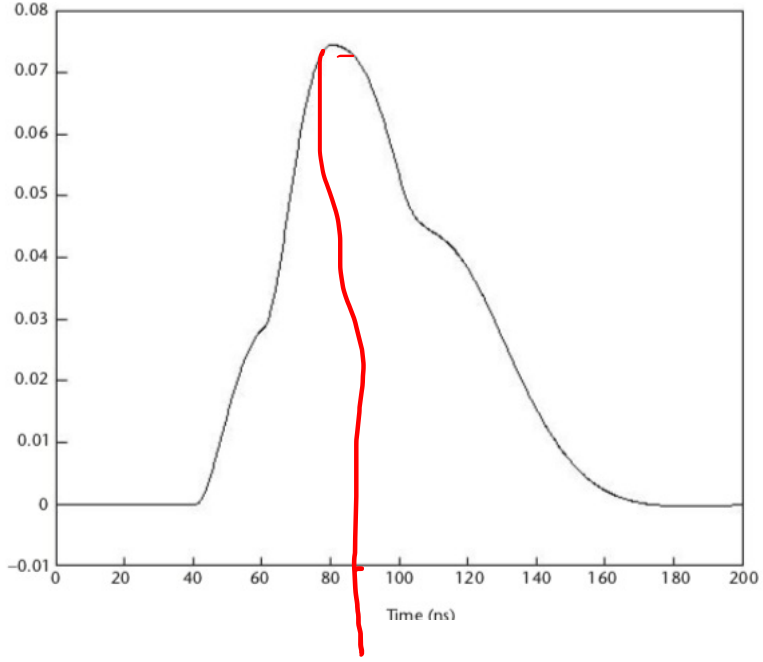


UWB → Banda Base

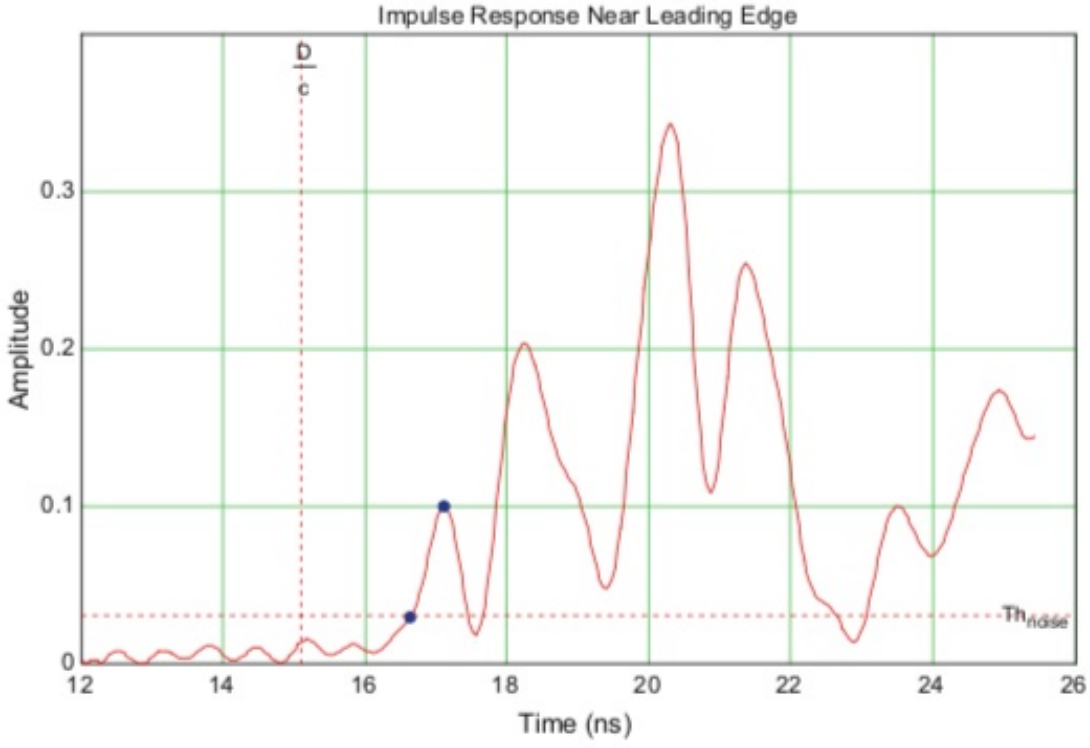
Pulso modulado

Medición de Tiempos: Efecto del ancho de banda

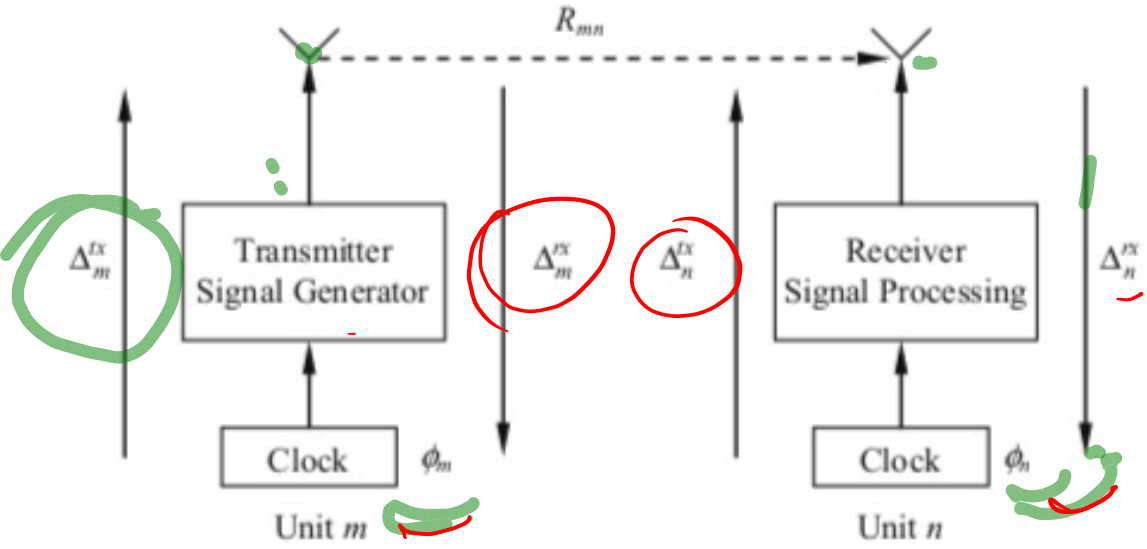




Medición de Tiempos

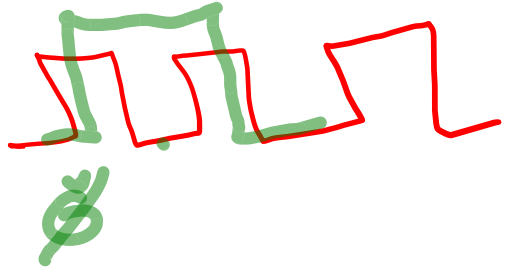


Medición de Tiempos entre Transmisor y Receptor



$$T_{OA} = \phi_m + \Delta_m^{TX} + \underbrace{R/C}_{T_D} + \Delta_n^{RX} - \phi_n$$

$$R_{TT} = \frac{(T_{OA1} + T_{OA2})}{2}$$



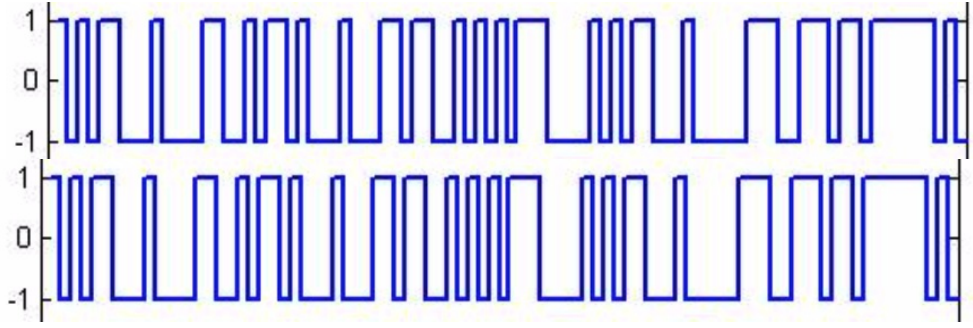
$$R_{TT} = \left\{ \phi_M + \Delta_M^{Tx} + T_D + \Delta_M^{Rx} - \phi_n \right\} + \left[\phi_n + \Delta_M^{Rx} + T_D + \Delta_M^{Tx} - \phi_m \right]$$

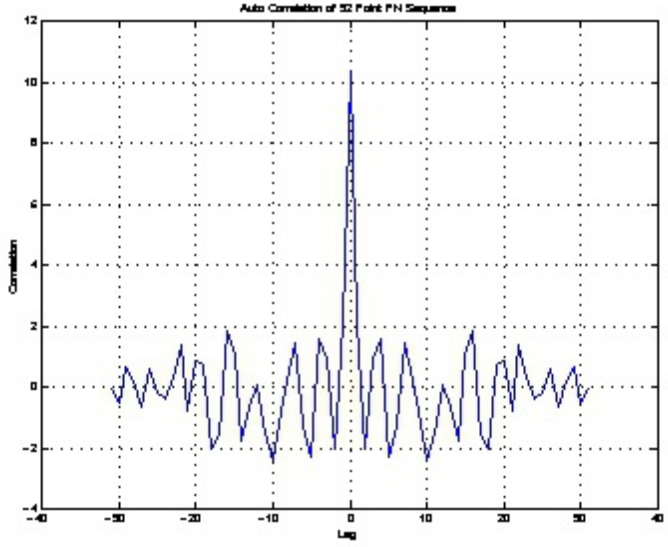
$$2R_{TT} = 2T_D + 2\Delta_M^{Tx} + 2\Delta_M^{Rx}$$

$$R_{TT} = T_D + \Delta_M^{Tx} + \Delta_M^{Rx}$$

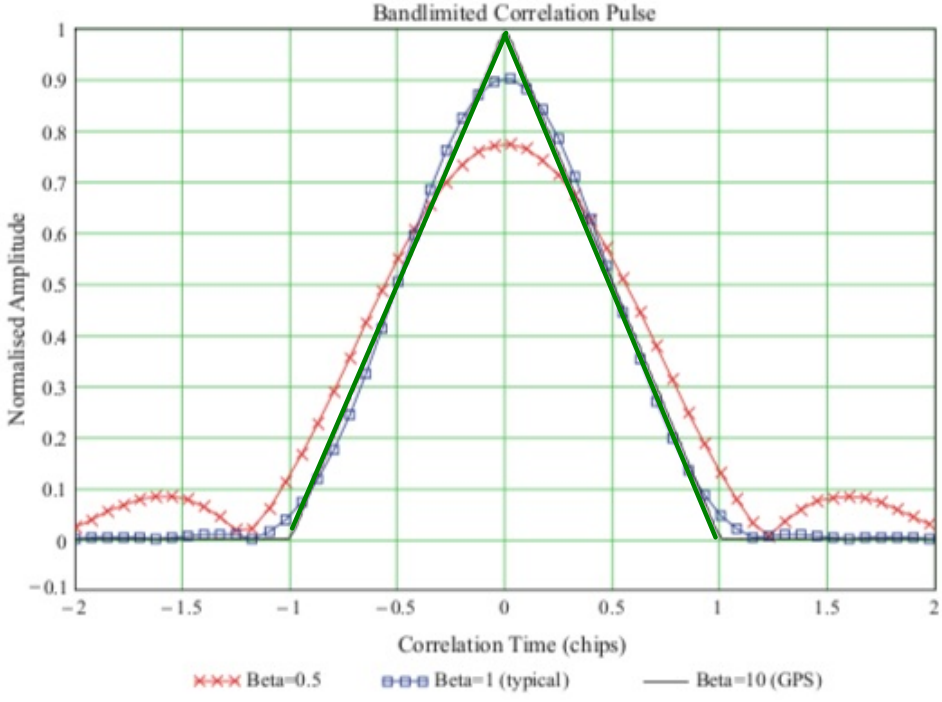
$$R_{TT} = T_D + \Delta_0$$

Algoritmo de Pico

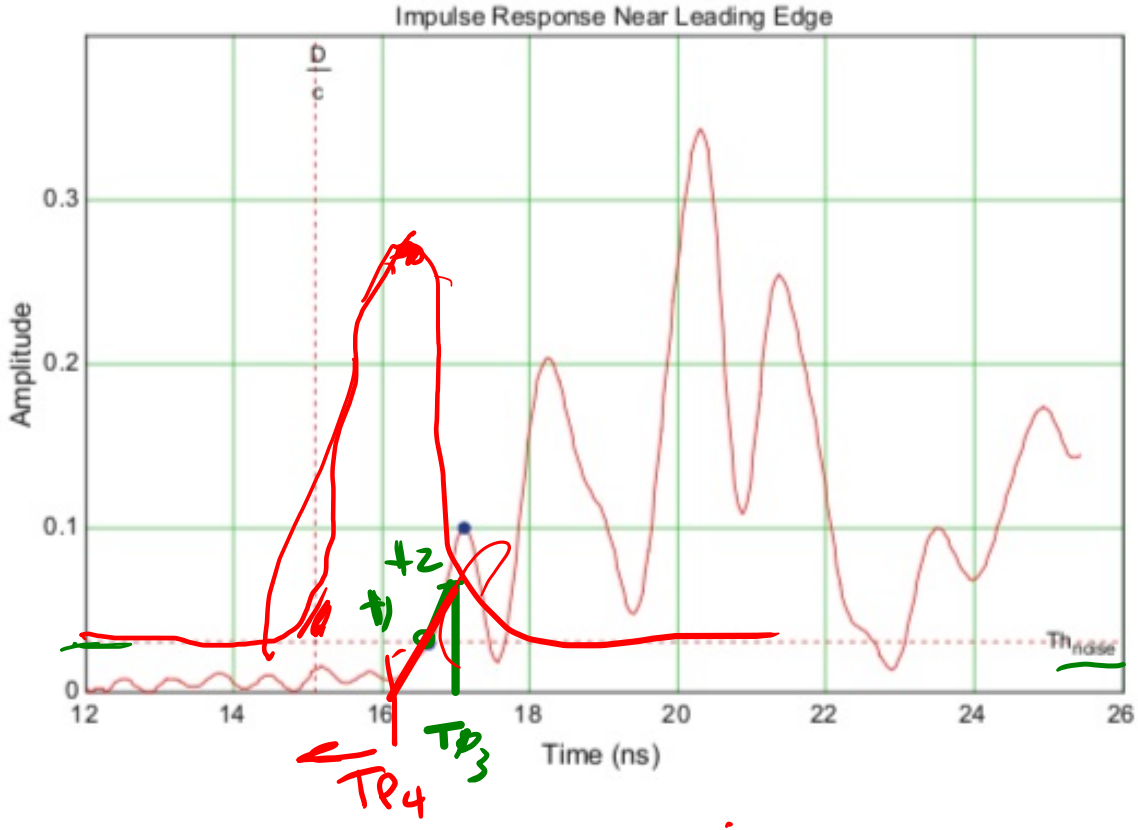




Algoritmo de Pico



Algoritmo de Umbral, de proporción, de proyección



(1) tiempo 1er pico

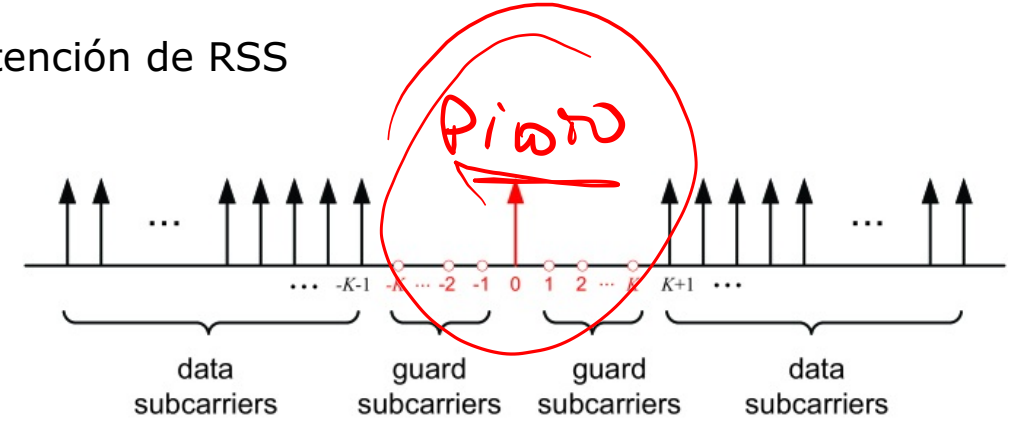
(2) diferencia en amplitud por arriba de la VFSO

(3) #1 cruce del pico

#2 proporc. del #1

(4) el 3 por proyección hacia atrás

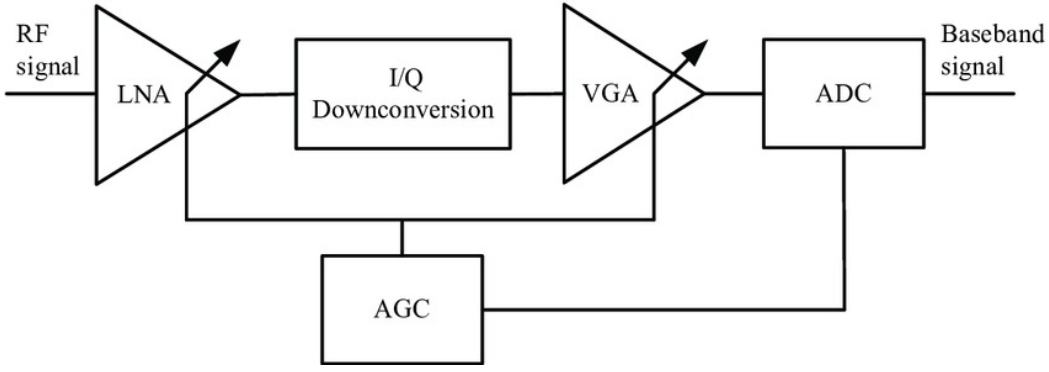
Obtención de RSS



PILOTO

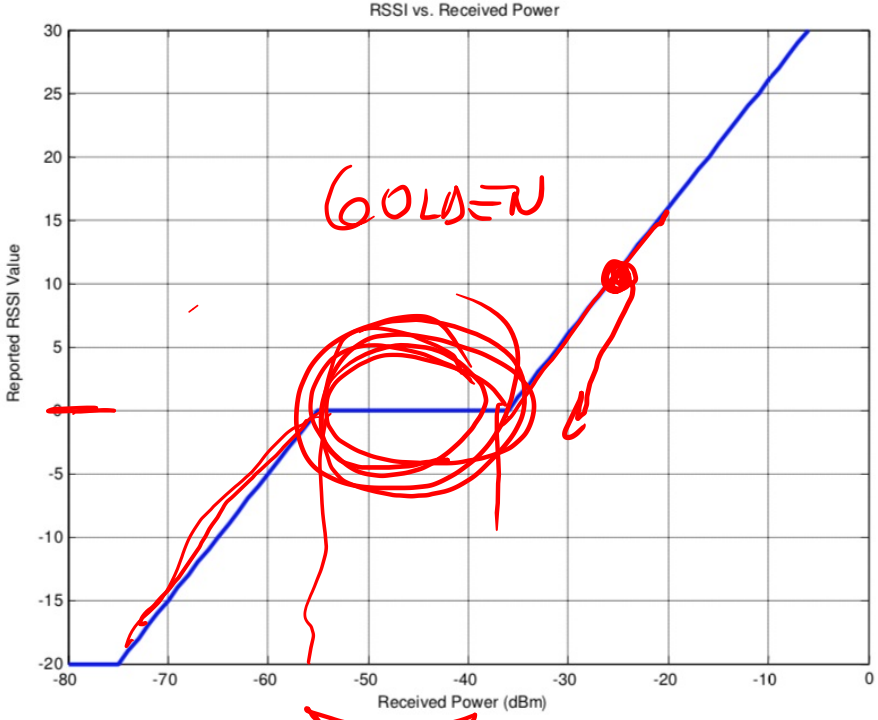
HAND OFF

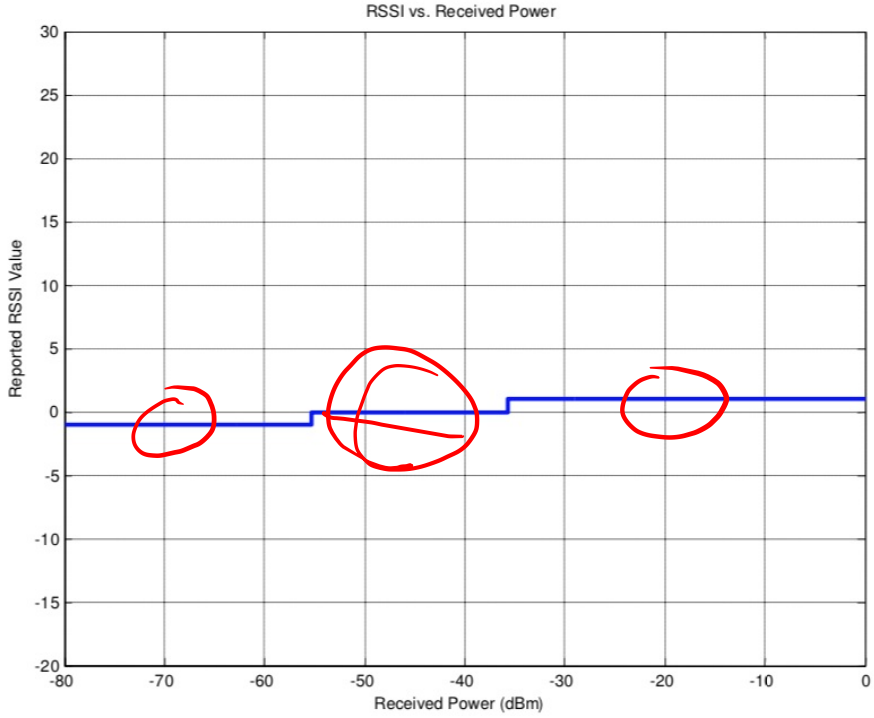
HAND OVER



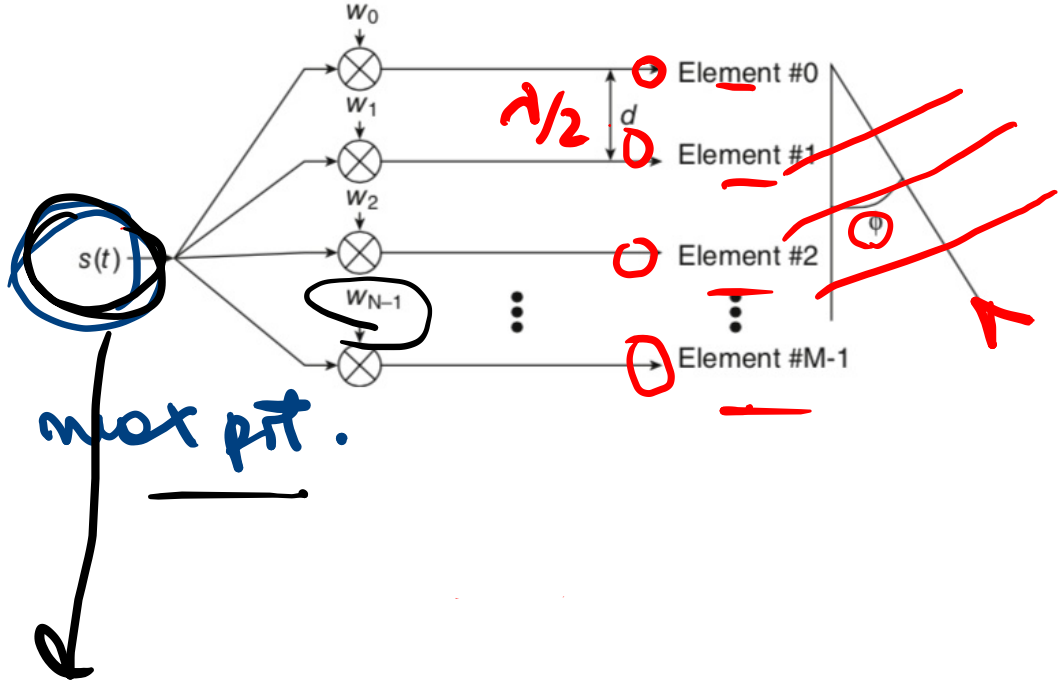
AUTOMATIC GAIN CONTROL

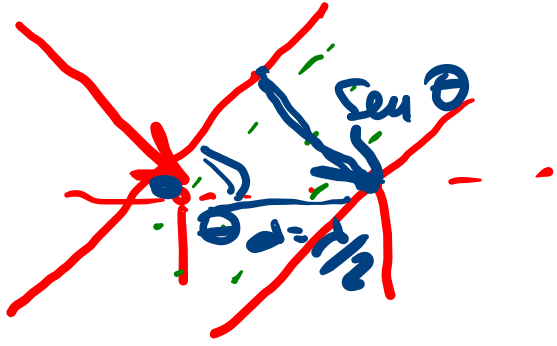
Obtención de RSS





Obtención de Ángulo de Arribo





MUSIC: MUltiple SIgnal Clasification

$$\phi(\theta_{DOA}) = -2\pi \frac{(i-1)d}{\lambda} \sin(\theta_{DOA})$$

$\Rightarrow \phi(\theta_{DOA})$

$\omega = e^{\quad} = \cos\phi + i \operatorname{sen}\phi$

$\bar{w} = \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_m \end{bmatrix}$ $N = \begin{bmatrix} n_1 \\ n_2 \\ \vdots \\ n_m \end{bmatrix}$

recibe una señal y $\bar{X} = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_m \end{bmatrix}$

$\bar{y} = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_m \end{bmatrix}$

$x_i = w_i y_i + n_i$

$\bar{X} = \bar{w}\bar{y} + N$

MUSIC : MULTIPLE SIGNAL CLASSIF.

$$R_{xx} = W R_{ss} W^T + \sigma^2 I$$

$$\hat{R}_{xx} = \sum_{i=1}^{N} x x^T$$

ergodicity

AUTOVAR.

$$[3 \times 3] \quad \hat{R}_{xx} = V \Lambda V^T$$

(QUADRATA)

AUTOV.

FUCUTES

$D = 1$

$M = 3$

ANTENNAS

M-D AUTOV $\neq 0$

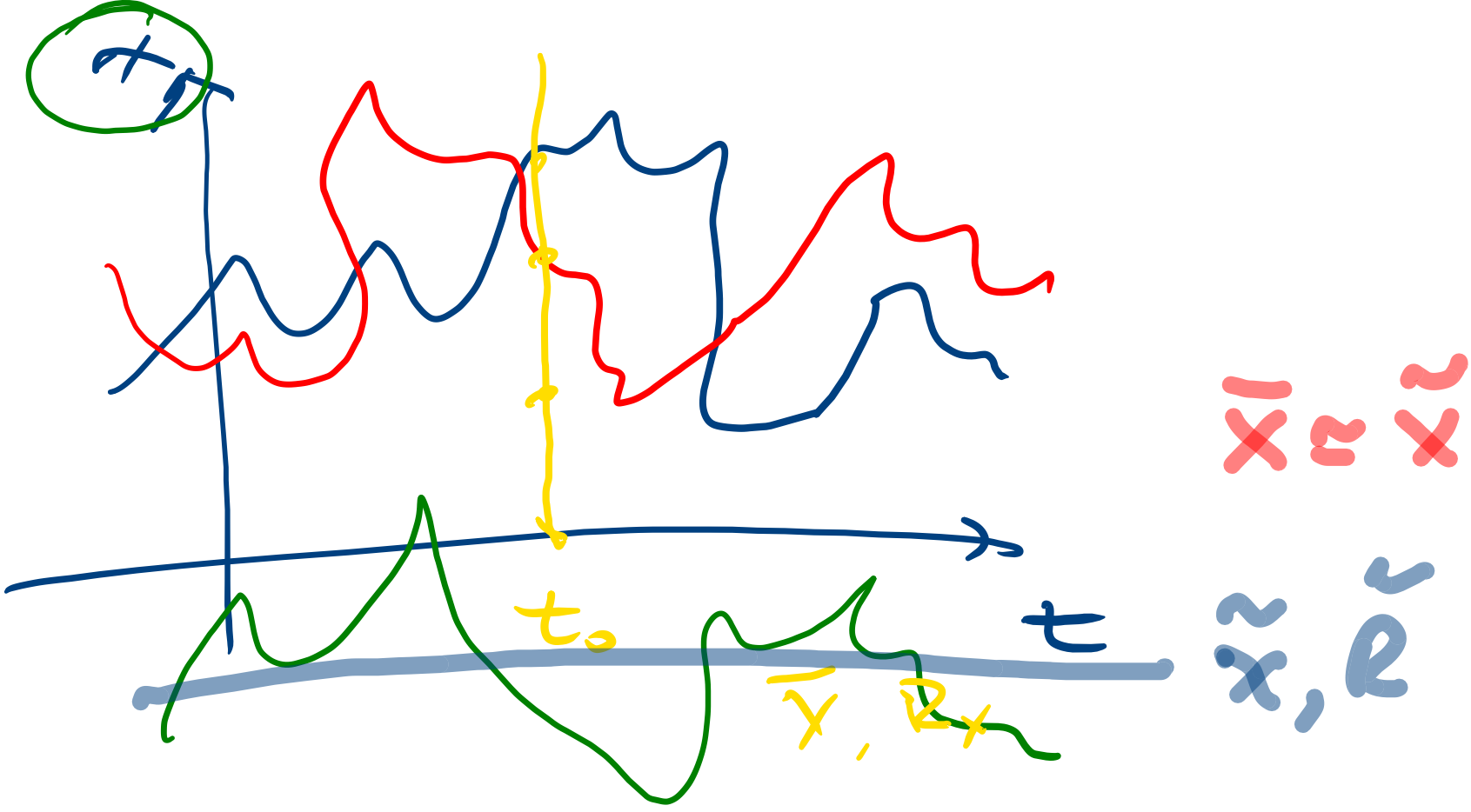
PERTURB

- identifico in M-D autov. nuovi rif.
- trovo V_c con in autovett corrisp. a in autovalori nuovi rif.

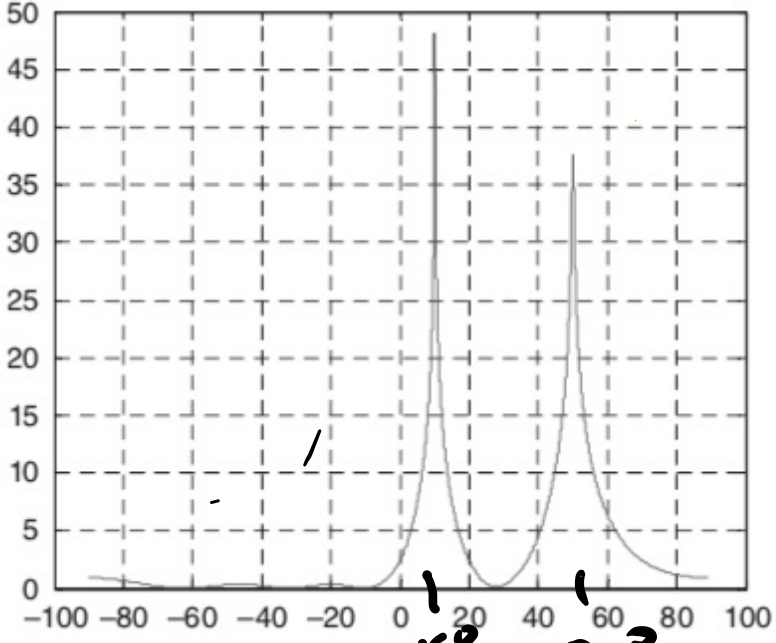
$$\hat{H} = \frac{1}{W^H V_c^H V_c W}$$

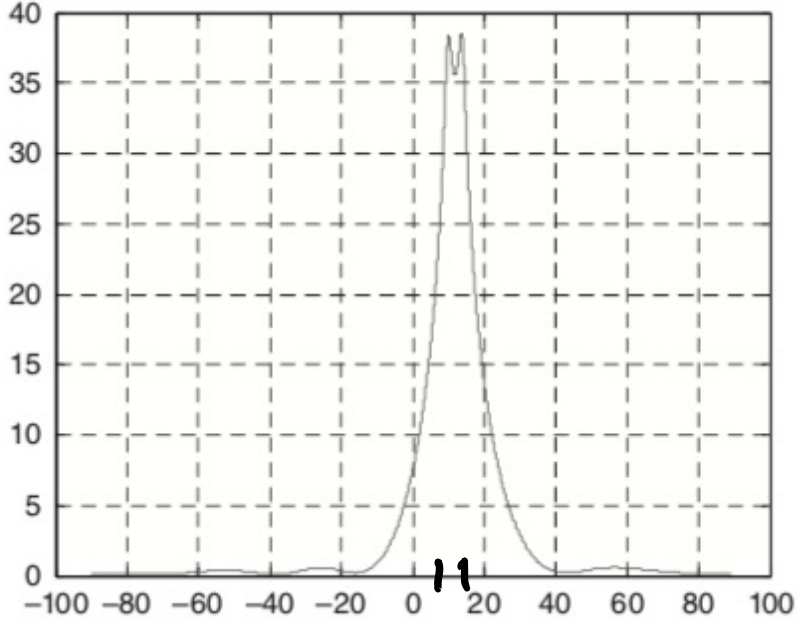
→ in quali corrisp. a by diver.

H: es trasp. coniug


x_1
t_0
t
$\bar{x}, R_x$
$\tilde{\bar{x}} \simeq \tilde{x}$
$\tilde{\bar{x}}, \tilde{R}$

MUSIC: MUltiple SIgnal Clasification






f
01
R

Outliers

"una observación que se desvía tanto de otras observaciones como para despertar sospechas de que fue generado por un mecanismo diferente".

Outlier

20 medidas

20 mes

N medidas, M anomalt

M < N

10

30

3 millones

Outliers

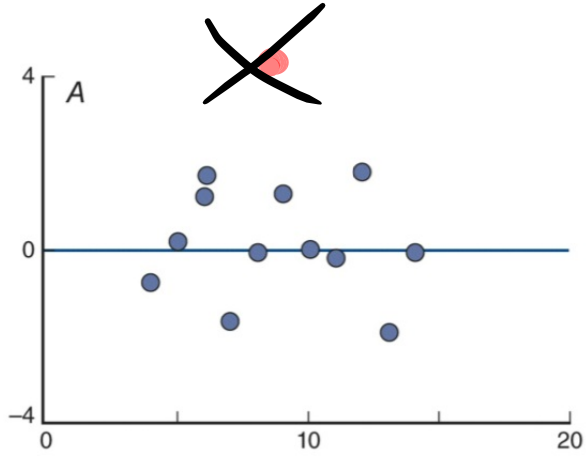
$$\Theta_{1,LS} = [\hat{x}, \hat{y}]^T = (G^T G)^{-1} G^T h$$

donde

$$G = \begin{bmatrix} \sin(\alpha_1^0) & -\cos(\alpha_1^0) \\ \vdots & \vdots \\ \sin(\alpha_M^0) & -\cos(\alpha_M^0) \end{bmatrix}.$$

y

$$h = \begin{bmatrix} x_1^0 \sin(\alpha_1^0) - y_1^0 \cos(\alpha_1^0) \\ \vdots \\ x_M^0 \sin(\alpha_M^0) - y_M^0 \cos(\alpha_M^0) \end{bmatrix}.$$



$\varepsilon_i = \alpha_i - \operatorname{tg} \frac{\hat{y} - y_i}{\hat{x} - x_i}$ B: la cant. de ang. reas.

$E = \sqrt{\frac{\sum \varepsilon_i^2}{M - B}}$

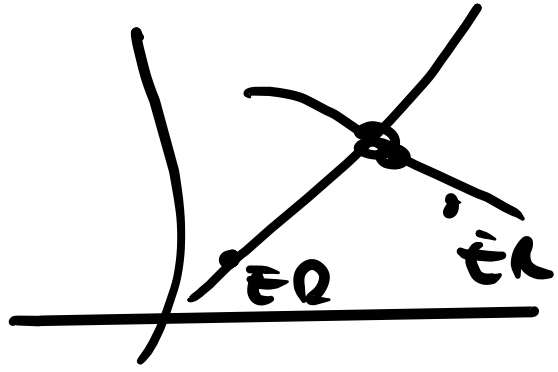
x_i, y_i est. de ref.

α_i: ángulo medido en x_i, y_i

M: cant. de ángulos medidos

en 2D ⟶ 2 ángulos

3D ⟶ 3 ángulos



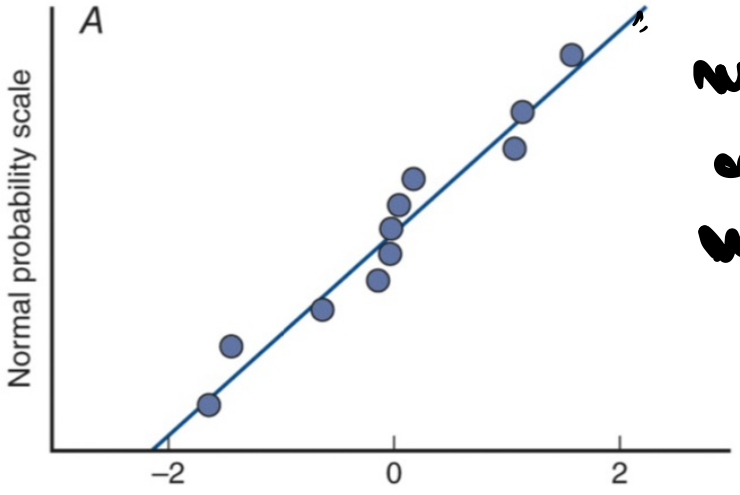
definir Umbral U_E

$E > U_E$ ⟶ DESCARTAS AR E: mayor

$E \overset{?}{\leq} U_E$

DETERMINISTA U_E

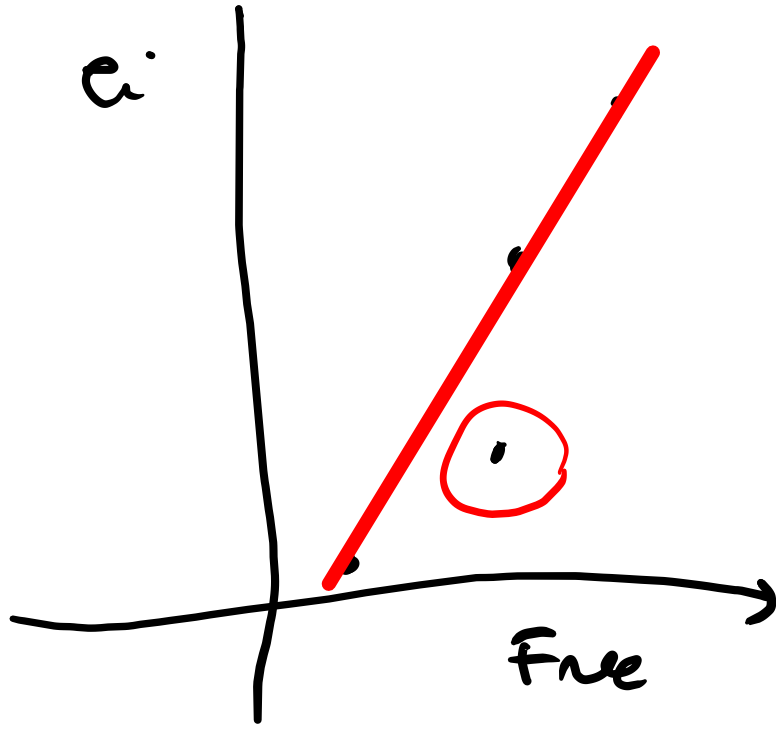
Outliers: Normal Probability Plots



z_i	Rango	Frec. acum
-1.92	1	0.125
-0.05	2	0.375
0.13	3	0.625
1.24	4	0.875

$$F_- \quad \frac{i-0.5}{n} = 4$$

e_i	Rango	Frec. acum
-1.92	1	0.125
-0.05	2	0.375
0.13	3	0.625
1.24	4	0.875



Outliers: Chi cuadrado : VECINO CERCANO

$$\varepsilon_i = \alpha_i - tg^{-1}\frac{\hat{y}-y_i}{\hat{x}-x_i}$$

N: cant. de medidas

$$\hat{S}_e = \sqrt{\frac{\sum \varepsilon_i^2}{N}}$$

$$\chi = \frac{\varepsilon_i^2}{\hat{S}_e}$$ → chi

si ε_i es gaussiano

ε_i^2 es chi cuadrado

definimos una cota q' es función de los grados lib (la desv. de $\hat{x}, \hat{y}$) y la cant.

en 2D, y 99%

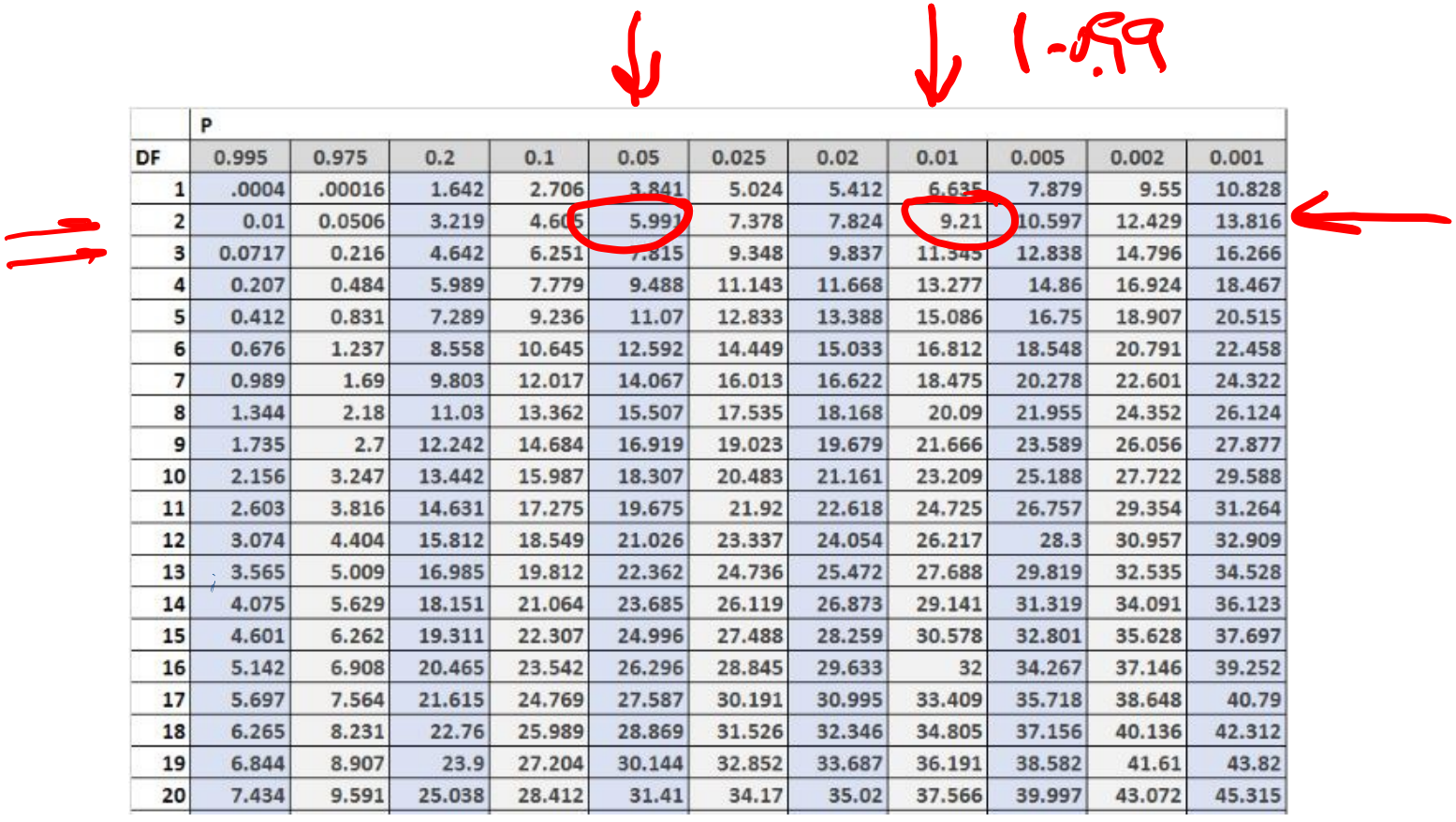
$y < \delta = 9.2$ → valide

$y > \delta = 9.2$ → out.

en 2D, y 90%

$y < 5.991$ → valide

$>$ → out.



	P										
DF	0.995	0.975	0.2	0.1	0.05	0.025	0.02	0.01	0.005	0.002	0.001
1	.0004	.00016	1.642	2.706	3.841	5.024	5.412	6.635	7.879	9.55	10.828
2	0.01	0.0506	3.219	4.605	5.991	7.378	7.824	9.21	10.597	12.429	13.816
3	0.0717	0.216	4.642	6.251	7.815	9.348	9.837	11.345	12.838	14.796	16.266
4	0.207	0.484	5.989	7.779	9.488	11.143	11.668	13.277	14.86	16.924	18.467
5	0.412	0.831	7.289	9.236	11.07	12.833	13.388	15.086	16.75	18.907	20.515
6	0.676	1.237	8.558	10.645	12.592	14.449	15.033	16.812	18.548	20.791	22.458
7	0.989	1.69	9.803	12.017	14.067	16.013	16.622	18.475	20.278	22.601	24.322
8	1.344	2.18	11.03	13.362	15.507	17.535	18.168	20.09	21.955	24.352	26.124
9	1.735	2.7	12.242	14.684	16.919	19.023	19.679	21.666	23.589	26.056	27.877
10	2.156	3.247	13.442	15.987	18.307	20.483	21.161	23.209	25.188	27.722	29.588
11	2.603	3.816	14.631	17.275	19.675	21.92	22.618	24.725	26.757	29.354	31.264
12	3.074	4.404	15.812	18.549	21.026	23.337	24.054	26.217	28.3	30.957	32.909
13	3.565	5.009	16.985	19.812	22.362	24.736	25.472	27.688	29.819	32.535	34.528
14	4.075	5.629	18.151	21.064	23.685	26.119	26.873	29.141	31.319	34.091	36.123
15	4.601	6.262	19.311	22.307	24.996	27.488	28.259	30.578	32.801	35.628	37.697
16	5.142	6.908	20.465	23.542	26.296	28.845	29.633	32	34.267	37.146	39.252
17	5.697	7.564	21.615	24.769	27.587	30.191	30.995	33.409	35.718	38.648	40.79
18	6.265	8.231	22.76	25.989	28.869	31.526	32.346	34.805	37.156	40.136	42.312
19	6.844	8.907	23.9	27.204	30.144	32.852	33.687	36.191	38.582	41.61	43.82
20	7.434	9.591	25.038	28.412	31.41	34.17	35.02	37.566	39.997	43.072	45.315