Excelのシート「 ⑦データ処理」

$$S_T = \sum_{i=1,j=1,k=1}^{18,2,3} {y_{ijk}}^2 = \text{SUMSQ(B5: G5)}$$

18行、誤差2、信号3

$$L1 = \text{M1}\times y_{11} + \text{M2}\times y_{12} + \text{M3}\times y_{13} = \$B\$4 * B5 + \$C\$4 * C5 + \$D\$4 * D5$$

$$= \text{SUMPRODUCT}(\$B\$4{:}\$D\$4, B5{:}D5)$$

掛算の和

$$L2 = \text{M1}\times y_{21} + \text{M2}\times y_{22} + \text{M3}\times y_{23} = \text{SUMPRODUCT}(\$E\$4{:}\$G\$4, E5{:}G5)$$

$$r = M1^2 + M2^2 + M3^2 = \$B\$4\text{^}2+\$C\$4\text{^}2+\$D\$4\text{^}2$$

$$= \text{SUMSQ}(\$B\$4{:}\$D\$4)$$

平方和

$$S_\beta = \frac{(L1+L2)^2}{2r} = ((I5+J5)\text{^}2)/(2*K5)$$

$$S_{N\times\beta} = \frac{(L1-L2)^2}{2r} = ((I5-J5)\text{^}2)/(2*K5)$$

$$\eta = \frac{(S_\beta - V_e)^2}{2rV_N} = 10 * \text{LOG}(((L5-O5)\text{^}2)/2/K5/P5)$$

$$S = \frac{(S_\beta - V_e)^2}{2r} = 10 * \text{LOG}(((L5-O5)\text{^}2)/2/K5)$$

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
2			N1			N2													
3		M1	M2	M3	M1	M2	M3										SN比	感度	
4	圧力	0.10	0.20	0.30	0.10	0.20	0.30	S_T	L1	L2	r	S_β	$S_{N\times\beta}$	Se	Ve	V_N	η	S	
5	L1	3.8	12.3	16.0	7.8	14.7	20.1	1102.7	7.64	9.75	0.14000000000	1080.0432	15.9	6.7264	1.6816	4.5254	59.6	66.2	L1
6	L2	11.8	19.5	17.3	15.2	16.0	17.7	1619.1	10.27	10.03	0.14000000000	1471.75	0.2057	147.15	36.789	29.472	54.0	68.7	L2
7	L3	12.9	34.3	34.6	15.0	20.8	21.3	3651.4	18.53	12.05	0.14000000000	3339.7729	149.97	161.65	40.413	62.323	58.0	75.9	L3
8	L4	10.9	19.2	22.8	10.8	22.4	25.6	2281.1	11.77	13.24	0.14000000000	2233.9289	7.7175	39.404	9.8509	9.4242	62.7	72.5	L4
9	L5	10.8	19.0	33.0	11.9	17.9	22.9	2553.1	14.78	11.64	0.14000000000	2492.9157	35.213	24.941	6.2354	12.031	62.6	73.4	L5
10	L6	11.2	26.0	36.6	14.2	25.8	34.6	4205.4	17.30	16.96	0.14000000000	4191.9557	0.4129	13.071	3.2679	2.6969	73.7	78.0	L6
11	L7	6.1	10.4	17.9	9.0	9.4	12.0	779.14	8.06	6.38	0.14000000000	744.69143	10.08	24.369	6.0921	6.8897	54.5	62.9	L7
12	L8	5.6	5.3	14.6	7.7	6.9	7.7	438.8	6.00	4.46	0.14000000000	390.75571	8.47	39.574	9.8936	9.6089	47.3	57.1	L8
13	L9	2.0	1.8	2.9	1.7	2.4	4.1	41.11	1.43	1.88	0.14000000000	39.128929	0.7232	1.2579	0.3145	0.3962	41.3	37.3	L9
14	L10	0.01	0.01	0.01	0.70	1.1	1.2	3.1403	0.01	0.65	0.14000000000	1.5369143	1.4812	0.1222	0.0305	0.3207	14.0	9.1	L10
15	L11	6.8	15.9	17.2	12.7	13.6	13.8	1131.6	9.02	8.13	0.14000000000	1050.4375	2.8289	78.314	19.578	16.229	53.7	65.8	L11
16	L12	0.01	0.01	0.01	1.70	1.10	0.90	4.9103	0.01	0.66	0.14000000000	1.5841286	1.5276	1.7986	0.4497	0.6652	8.4	6.6	L12
17	L13	0.01	0.01	0.01	0.01	1.2	1.0	2.4404	0.01	0.541	0.14000000000	1.0686036	1.0222	0.3496	0.0874	0.2744	11.0	5.4	L13
18	L14	11.3	23.5	35.0	11.7	26.7	37.8	4183.6	16.33	17.85	0.14000000000	4172.4014	8.2514	2.9071	0.7268	2.2317	74.4	77.9	L14
19	L15	7.5	14.0	28.7	8.0	13.9	30.3	2251.2	12.16	12.67	0.14000000000	2201.8889	0.9289	48.422	12.106	9.8702	62.4	72.3	L15
20	L16	4.1	17.3	32.7	8.9	21.8	27.0	2668.8	13.68	13.35	0.14000000000	2609.3604	0.3889	59.091	14.773	11.896	63.1	73.8	L16
21	L17	0.01	0.01	0.01	1.00	0.70	1.60	4.0503	0.01	0.72	0.14000000000	1.8824143	1.8207	0.3472	0.0868	0.4336	14.2	10.6	L17
22	L18	10.5	21.9	42.8	13.4	25.8	35.4	4520.1	18.27	17.12	0.14000000000	4473.0432	4.7232	42.294	10.573	9.4034	68.8	78.5	L18

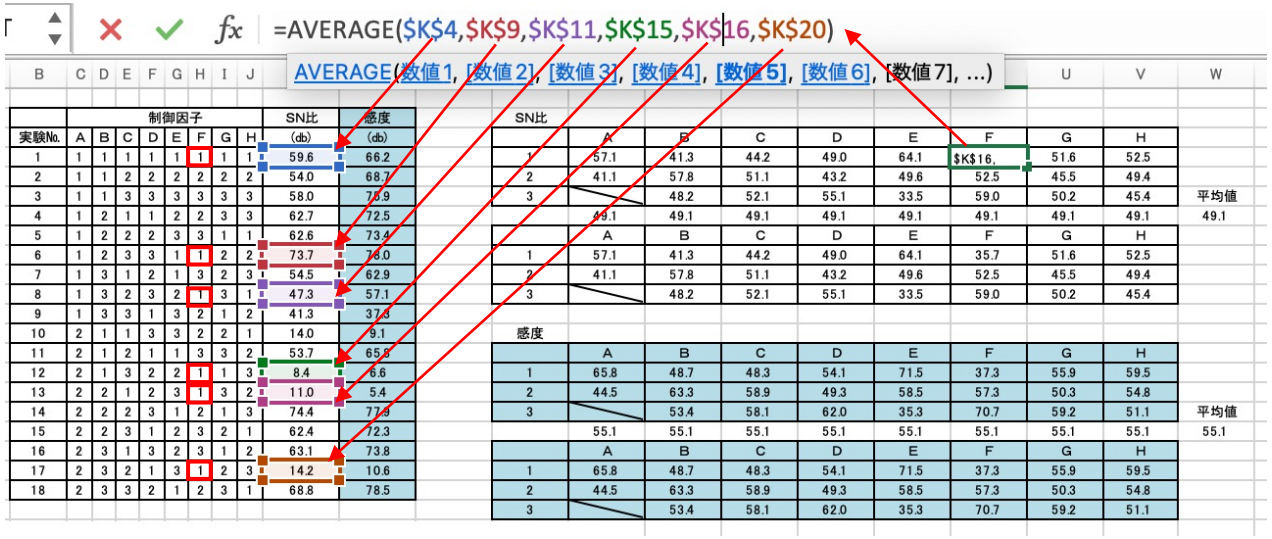
$$V_N = (S_T - S_\beta)/5 = (H5 - L5)/5$$

$$V_e = S_e/4 = N5/4$$

$$S_e = S_T - S_\beta - S_{N\times\beta} = H5 - L5 - M5$$

その１

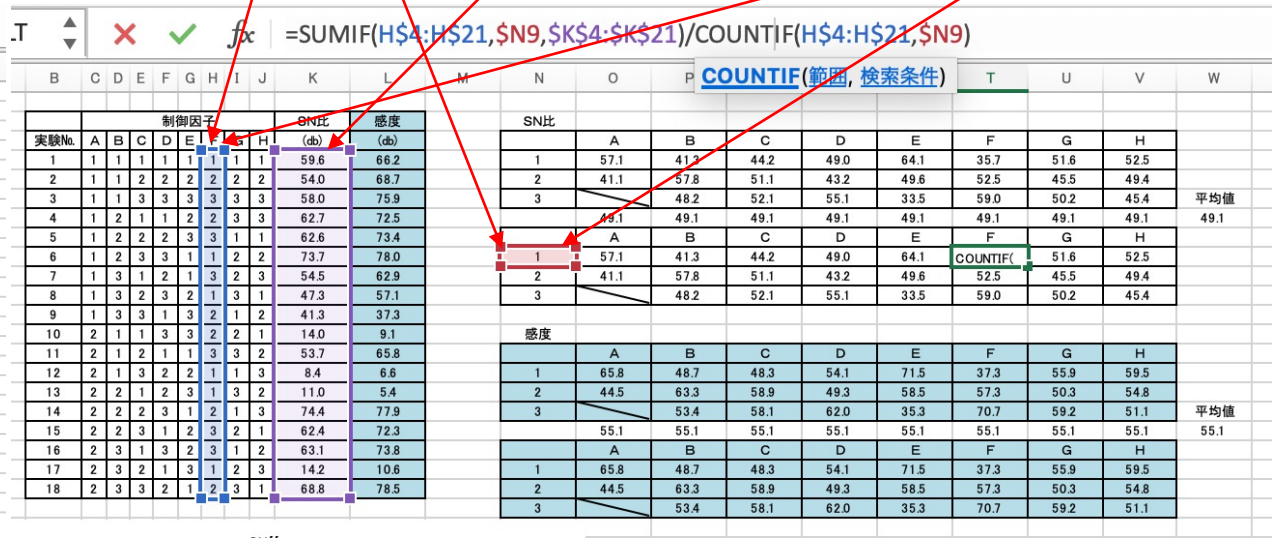
F列の水準1に対する6個のSN比の平均値を算出



その２

F列で水準1であるSN比の合計値／ F列で水準1であるセルの数

=SUMIF(F列、水準、SN比の列）／COUNTIF(F列、水準）



	制御因子								SN比	感度
実験No.	A	B	C	D	E	F	G	H	(db)	(db)
1	1	1	1	1	1	1	1	1	59.6	66.2
2	1	1	2	2	2	2	2	2	54.0	68.7
3	1	1	3	3	3	3	3	3	58.0	75.9
4	1	2	1	1	2	2	3	3	62.7	72.5
5	1	2	2	2	3	3	1	1	62.6	73.4
6	1	2	3	3	1	1	2	2	73.7	78.0
7	1	3	1	2	1	3	2	3	54.5	62.9
8	1	3	2	3	2	1	3	1	47.3	57.1
9	1	3	3	1	3	2	1	2	41.3	37.3
10	2	1	1	3	3	2	2	1	14.0	9.1
11	2	1	2	1	1	3	3	2	53.7	65.8
12	2	1	3	2	2	1	1	3	8.4	6.6
13	2	2	1	2	3	1	3	2	11.0	5.4
14	2	2	2	3	1	2	1	3	74.4	77.9
15	2	2	3	1	2	3	2	1	62.4	72.3
16	2	3	1	3	2	3	1	2	63.1	73.8
17	2	3	2	1	3	1	2	3	14.2	10.6
18	2	3	3	2	1	2	3	1	68.8	78.5

SN比

	A	B	C	D	E	F	G	H	
1	57.1	41.3	44.2	49.0	64.1	35.7	51.6	52.5	
2	41.1	57.8	51.1	43.2	49.6	52.5	45.5	49.4	
3		48.2	52.1	55.1	33.5	59.0	50.2	45.4	平均値
	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1

	A	B	C	D	E	F	G	H
1	57.1	41.3	44.2	49.0	64.1	35.7	51.6	52.5
2	41.1	57.8	51.1	43.2	49.6	52.5	45.5	49.4
3		48.2	52.1	55.1	33.5	59.0	50.2	45.4

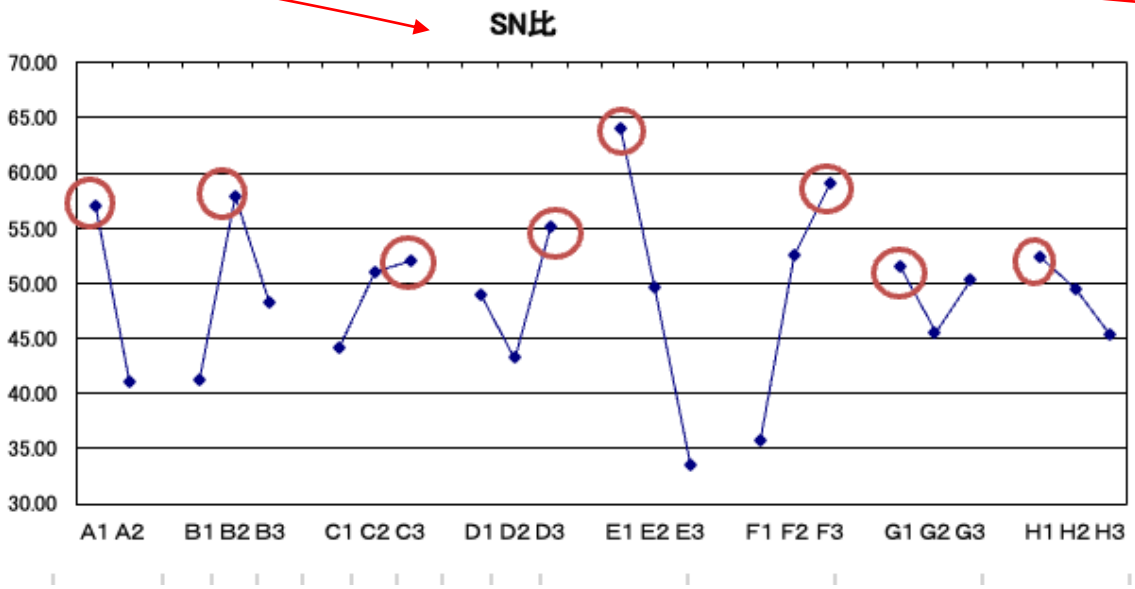
感度

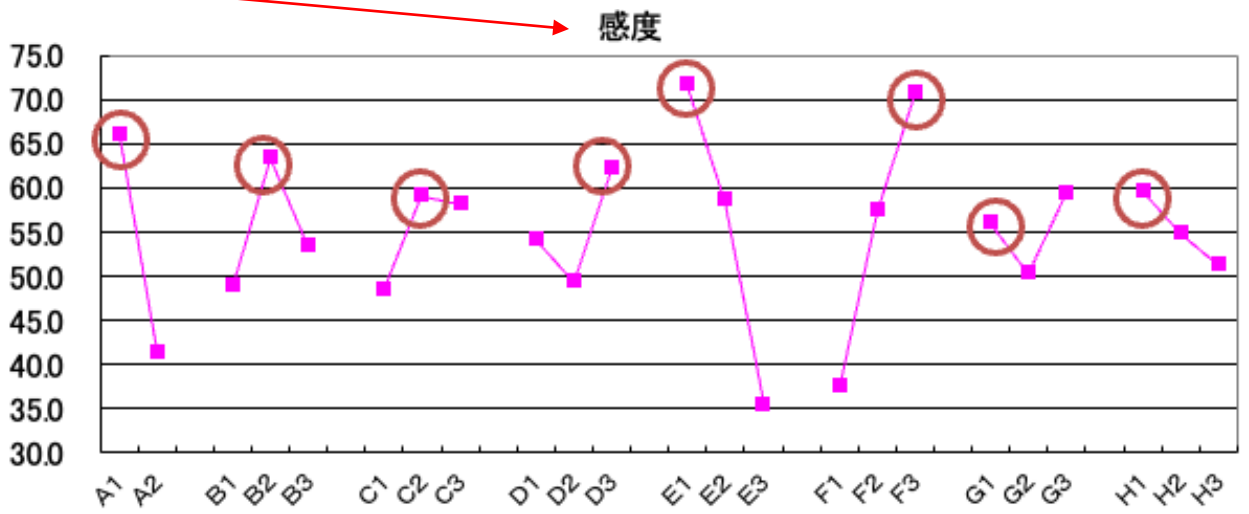
	A	B	C	D	E	F	G	H	
1	65.8	48.7	48.3	54.1	71.5	37.3	55.9	59.5	
2	44.5	63.3	58.9	49.3	58.5	57.3	50.3	54.8	
3		53.4	58.1	62.0	35.3	70.7	59.2	51.1	平均値
	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1

	A	B	C	D	E	F	G	H
1	65.8	48.7	48.3	54.1	71.5	37.3	55.9	59.5
2	44.5	63.3	58.9	49.3	58.5	57.3	50.3	54.8
3		53.4	58.1	62.0	35.3	70.7	59.2	51.1

SN比
感度

A1	A2		B1	B2	B3		C1	C2	C3		D1	D2	D3		E1	E2	E3		F1	F2	F3		G1	G2	G3		H1	H2	H3
57.1	41.1		41.3	57.8	48.2		44.2	51.1	52.1		49.0	43.2	55.1		64.1	49.6	33.5		35.7	52.5	59.0		51.6	45.5	50.2		52.5	49.4	45.4
65.8	41.1		48.7	63.3	53.4		48.3	58.9	58.1		54.1	49.3	62.0		71.5	58.5	35.3		37.3	57.3	70.7		55.9	50.3	59.2		59.5	54.8	51.1





SN比

	A	B	C	D	E	F	G	H	
1	57.1	41.3	44.2	49.0	64.1	35.7	51.6	52.5	
2	41.1	57.8	51.1	43.2	49.6	52.5	45.5	49.4	
3		48.2	52.1	55.1	33.5	59.0	50.2	45.4	平均値
	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1	49.1

=LOOKUP(L30,N4:N6,O4:O6)

青枠内の数字と同じ緑枠の数字に対応するピンク枠内の値を得る

感度

	A	B	C	D	E	F	G	H	
1	65.8	48.7	48.3	54.1	71.5	37.3	55.9	59.5	
2	44.5	63.3	58.9	49.3	58.5	57.3	50.3	54.8	
3		53.4	58.1	62.0	35.3	70.7	59.2	51.1	平均値
	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1	55.1

最適条件

因子	A	B	C	D	E	F	G	H	全体平均	推定値
水準	1	2	3	3	1	3	3	1		
SN比	57.1	57.8	52.1	55.1	64.1	59.0	50.2	52.5	49.1	104.2
感度	65.8	63.3	58.1	62.0	71.5	70.7	59.2	59.5	55.1	124.2

最悪条件

因子	A	B	C	D	E	F	G	H	全体平均	推定値
水準	2	1	1	2	3	1	2	3		
SN比	41.1	41.3	44.2	43.2	33.5	35.7	45.5	45.4	49.1	-13.8
感度	44.5	48.7	48.3	49.3	35.3	37.3	50.3	51.1	55.1	-21.1

SN比の利得(推定値)

最適	比較	利得
104.2	-13.8	118.1

感度の利得(推定値)

最適	比較	利得
124.2	-21.1	145.4

SN比の利得(確認実験)

最適	比較	利得
25.2	3.0	22.2

	最適	最悪	利得
推定	104.2	-13.8	118.1
確認	25.2	3.0	22.2