Poirot Lucas

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SAE R5A21 Compléments de probabilités et statistique

Tests d'hypothèse avec l'application R

Exercice 1

1)a) Le seuil $\bar{x}_s = 1.9009234$

$R = [1.9009234;+\infty[$

b) $\beta(\mu 1) = 0.7691$

c)

$\bar{x}_s$	R	$\beta(\mu 1)$	$\pi(\mu 1)$
1.9009234	[1.9009234;+∞[	0.7691	0.23208956

2) a)

$\bar{x} = 1.88776$

b)

$\bar{x} \notin R$ donc on ne peut pas rejeter H_0 au niveau 5%.

c)

$Pc(\bar{x}) = 0.052529$

d)

Test non significatif car $Pc(\bar{x}) > 0.05$

e)

On ne peut pas rejeter H0 au niveau 1 % car $Pc(\bar{x}) > 0.01$

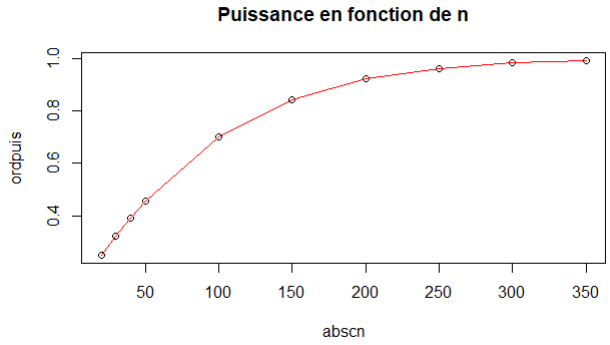
Exercice 2

1)a)

n	$\bar{x}_s$	R	$\beta(\mu_1)$	$\pi(\mu_1)$
20	2.103401	[2.103401 ;+∞[	0.750445	0.249555
30	1.9009234	[1.9009234 ;+∞[	0.6765674	0.3234326
40	1.7802226	[1.7802226;+∞[	0.6081626	0.3918374

50	1.6978523	[1.6978523;+∞[	0.5449011	0.4550989
100	1.4934561	[1.4934561 ;+∞[	0.3009003	0.6990997
150	1.4029052	[1.4029052;+∞[	0.1565448	0.8434552
200	1.34892615	[1.34892615;+∞[	0.07790932	0.92209068
250	1.31208903	[1.31208903;+∞[	0.03746054	0.96253946
300	1.28489701	[1.2848970;+∞[	0.01751882	0.98248118
350	1.263 763	[1.263 763;+∞[	0,008 006 732	0,991 993 3

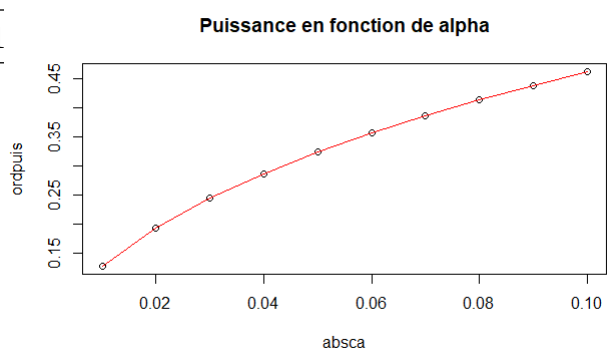
$\mu_1 = 1.65$
$\sigma = 3$
b)



Quand on augmente n, la puissance tend vers 1.
2)a)

α	$\bar{x}_s$	R	$\beta(\mu_1)$	$\pi(\mu_1)$
0.01	2.2741932	[2.2741932;+∞[	0.8727768	0.1272232
0.02	2.1248846	[2.1248846;+∞[	0.8070336	0.1929664
0.03	2.0301531	[2.0301531;+∞[	0.7561781	0.2438219
0.04	1.9588903	[1.9588903;+∞[	0.7136072	0.2863928
0.05	1.9009234	[1.9009234;+∞[	0.6765674	0.3234326
0.06	1.8515846	[1.8515846;+∞[	0.6435788	0.3564212
0.07	1.8083240	[1.8083240;+∞[	0.6137318	0.3862682
0.08	1.7695894	[1.7695894;+∞[	0.5864176	0.4135824
0.09	1.734 3618	[1.7343618;+∞[	0.5612041	0.4387959
0.10	1.701			0.4622292

b)

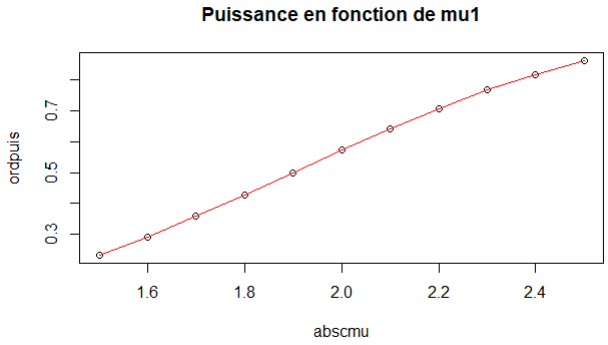


Quand alpha augmente, la puissance augmente.

3) a)

μ_1	$\bar{x}_s$	R	$\beta(\mu_1)$	$\pi(\mu_1)$
1.5	1.9009234	[1.9009234;+∞[	0.7679104	0.2320896
1.6	1.9009234	[1.9009234;+∞[	0.7086374	0.2913626
1.7	1.9009234	[1.9009234;+∞[	0.6431287	0.3568713
1.8	1.9009234	[1.9009234;+∞[	0.5730953	0.4269047
1.9	1.9009234	[1.9009234;+∞[	0.5006726	0.4993274
2.0	1.9009234	[1.9009234;+∞[	0.4282277	0.5717723
2.1	1.9009234	[1.9009234;+∞[	0.3581297	0.6418703
2.2	1.9009234	[1.9009234;+∞[	0.2925204	0.7074796
2.3	1.9009234	[1.9009234;+∞[	0.2331199	0.7668801
2.4	1.9009234	[1.9009234;+∞[	0.181099	0.818901
2.5	1.9009234	[1.9009234;+∞[	0.1370303	0.8629697

b)



Quand μ_1 augmente, la puissance augmente

Exercice 3

1)
$\lambda = 4.35$

2)

Nombre d'appels x_i	0	1	2	3	4	5
Nombre de minutes n_i observées	4	18	33	49	41	33
Nombre théorique de minutes attendu $th_i = nq_i$	3.0976350	13.4747123	29.3074993	42.4958740	46.2142630	40.2064088

Nombre d'appels x_i	6	7	8	9	10	11	12
Nombre de minutes n_i observées	19	16	8	6	6	4	3
Nombre théorique de minutes attendu $th_i = nq_i$	29.1496464	18.1144231	9.8497176	4.7606968	2.0709031	0.8189481	0.2968687

3)

x_i	0-1	2	3	4	5	6	7	8	9-10-11-12
n_i observés	22	33	49	41	33	19	16	8	19
$th_i = nq_i$	16.572 347 3	29.3074993	42.4958 740	46.2142 630	40.2064 088	29.1496 464	18.1144 231	9.84971 76	7.947 416 7

4)
d = 24.617

5)

ν=13-1-1-4 = 7

6)

δ = 14.06714

7) R = [14.06714;+∞[
8)
d ∈ R donc on peut rejeter H_0.
9)
Pc = 0.0008868198 < 0.001 donc le test est hautement significatif.

10)
On rejette H_0 à 1% car Pc < 0.01.