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| Tests paramétriques |
| TP4 Analyse de données |

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## Question 1

T16 = [39 39 40 33 36 40 37 41 39 34 42 41 42 44 42 42 39 42 41 40 43 43 40 39 37];  
T\_ref = 37.5;  
T\_mean = mean(T16);  
  
%Nous sommes ici dans le cas d'un petit échantillon gaussien de variance  
%inconnue que nous approcherons par la variance de l'échantillon.  
  
%Nous faisons l'hypothese que l'année 2016 est une année exeptionelle  
  
%Nous prendrons un seuil a 95%  
  
a\_t = tinv((1+0.95)/2, length(T16) - 1);  
  
std\_T = std(T16);  
  
%Notre intervalle est donc :  
  
I\_compatible = [T\_ref - a\_t \* std\_T / (length(T16) - 1)^0.5, T\_ref + a\_t \* std\_T / (length(T16) - 1)^0.5];  
  
Hypothese = (T\_mean > I\_compatible(1)) && (T\_mean < I\_compatible(2))  
  
  
"Nous contastatons donc que la valeur moyenne de l'échantillon est hors de l'intervalle de compatibilité.";  
"Nous pouvons donc conclure que la valeur est anormalement élevée.";  
"L'année 2016 est bien exeptionelle."

Hypothese =  
  
 logical  
  
 0  
  
  
ans =   
  
 "L'année 2016 est bien exeptionelle."

## Question 2

load deerSample.mat   
  
%Ce fichier correspond au tableau de l’énoncé.  
  
level\_capture = Sample1(:,2:2);  
level\_after30 = Sample1(:,3:3);  
  
mean\_capture = mean(level\_capture);  
mean\_after30 = mean(level\_after30);  
n1 = length(level\_capture);  
n2 = length(level\_after30);  
var1 = var(level\_capture);  
var2 = var(level\_after30);  
  
%Considering that we have a small sample, from which we don't know the  
%variance:  
%We are going to test our experience with a 0.05 risk.  
  
a\_t = tinv((1+0.95)/2, n1 + n2 - 2);  
  
% Let's assume that the to sample are equivalent.  
delta\_androgen\_level = abs(mean\_capture - mean\_after30)  
reject\_limit = a\_t \* (1 / n1 + 1 / n2)^0.5 \* ((var1 .\* n1 + var2 .\* n2)/(n1 + n2 - 2))^0.5  
  
% If so delta\_androgen\_level must be inferior to the reject limit  
delta\_androgen\_level < reject\_limit  
  
Conclusion = ["The to sample are the same, therefore can't say anything about the efficiency of this drug on the deers"]

delta\_androgen\_level =  
  
 9.8480  
  
  
reject\_limit =  
  
 19.2225  
  
  
ans =  
  
 logical  
  
 1  
  
  
Conclusion =   
  
 "The to sample are the same, therefore can't say anything about the efficiency of this drug on deers"

## Question 3

% Let's consider that we are sure about the 60% effectivness of the common  
% drug. Therefore n1 = +infinite  
% Let's assume that the 70% effectiness was obtain with a bernoulli law of  
% probability 0.7  
% Let's make the hypothesis H0 that p = p\_0  
% With a 5% risk :  
  
n = 100;  
p = 0.7;  
p\_0 = 0.6;  
a\_t = norminv((1 + 0.95)/2, 0, 1);  
H0 = (p - p\_0) > a\_t \* (p \* ( 1 - p) / 100)^0.5

H0 =  
  
 logical  
  
 1

Since it's true we have to reject the hypothesis HO, therefore the new drug is more effective than the previous one.

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