Tests paramétriques

TP4 Analyse de données

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Sommaire :

```
%*************************************************************************
%******************************** TP 4 ************************************
%*************************************************************************
```

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 H0, therefore the new drug is more effective than the previous one.

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