

# TP4 : Tests paramétriques

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## 1 Meteo

**Question 1:** Les données de la variable T16 représentent les températures maximales enregistrées en 2016 dans plusieurs stations météo du Portugal. Un rapport du centre de Météorologie portugais précise que la moyenne des températures maximales enregistrées au Portugal au fil des ans est de 37.5. L'année 2016 est-elle exceptionnelle ?

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]

## 2 Blood Sample Data

In a study<sup>1</sup> conducted in the Forestry and Wildlife Department at Virginia Tech, J. A. Wesson examined the influence of the drug succinylcholine on the circulation levels of androgens in the blood. Blood samples were taken from wild, free-ranging deer immediately after they had received an intramuscular injection of succinylcholine administered using darts and a capture gun. A second blood sample was obtained from each deer 30 minutes after the first sample, after which the deer was released. The levels of androgens at time of capture and 30 minutes later, measured in nanograms per milliliter (ng/mL), for 15 deers are given in Table.

Deer	Androgen (ng/mL)	
	At Time of Injection	30 Minutes after Injection
1	2.76	7.02
2	5.18	3.10
3	2.68	5.44
4	3.05	3.99
5	4.10	5.21
6	7.05	10.26
7	6.60	13.91
8	4.79	18.53
9	7.39	7.91
10	7.30	4.85
11	11.78	11.10
12	3.90	3.74
13	26.00	94.03
14	67.48	94.03
15	17.04	41.70

**Question 2:** Assuming that the populations of androgen levels at time of injection and 30 minutes later are normally distributed, test at the 0.05 level of significance whether the androgen concentrations are altered after 30 minutes.

1. tiré de R. E. Walpole, R. H. Myers, S. L. Myers, et K. E. Ye, Probability & Statistics for Engineers & Scientists 2016.

### 3 Nervous breakdown

A commonly prescribed drug for relieving nervous tension is believed to be only 60% effective. Experimental results with a new drug administered to a random sample of 100 adults who were suffering from nervous tension show that 70 received relief.

**Question 3:** Is this sufficient evidence to conclude that the new drug is superior to the one commonly prescribed? Use a 0.05 level of significance.