

Université de Nantes
UFR STAPS

Année universitaire 2011/2012

1^{ère} session, 2nd semestre

Année d'études : **Licence 2^{ème} année**
Enseignant responsable : **Thibault DESCHAMPS**

Durée de l'épreuve : **1h30**
Documents autorisés : **calculatrice**

UED 49 : Outils et méthodes

EC 491 : Statistiques

Tables statistiques p. 4-5

Exercice 1

1) Les performances réalisées au test du Cooper par les militaires d'un régiment (régiment I) sont distribuées selon une loi normale de moyenne 2800 mètres et d'écart-type 400 mètres.

a) Quelle proportion de militaires a réalisé une performance comprise entre 2700 mètres et 3200 mètres.

b) Trouver la valeur telle que la probabilité d'observer une performance inférieure à cette valeur est de 90%.

2) Les performances réalisées au Cooper par les militaires d'un deuxième régiment (régiment II) sont distribuées selon une loi normale de moyenne 2900 mètres et d'écart-type 625 mètres. Quel pourcentage de militaires du régiment II réalisent des performances supérieures à la moyenne des performances des militaires du régiment I.

Exercice 2

Un professeur d'éducation physique obtient sur un groupe de 24 élèves de même âge (13 ans) une moyenne en évaluation d'athlétisme de 12,6 (écart type = 4,3). Les notes sont détaillées ci-après :

12 15 16 10 19 13 9 17 16 15 9 19
20 13 15 10 12 4 13 7 15 5 9 10

En considérant les notes normalement distribuées, pouvez-vous dire au seuil .05, quelles sont les limites de confiance de la moyenne obtenue?

Exercice 3

Un entraîneur de natation prépare une cohorte de nageurs à l'une des épreuves du BNSSA qu'est le 800 m palmes, masque, tuba et espère que ses élèves réaliseront l'épreuve « blanche » avec un temps moyen de 12,8 minutes. Finalement, les temps réalisés par les 7 nageurs ayant tenu cette distance sont les suivants :

Temps	11,2	12,5	13,1	11,8	10,4	11,6	13,2
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La variance de cette distribution est égale à 1,049.

En supposant la normalité des performances, que peut-il conclure au risque 5% ?

Exercice 4

On mesure les performances en saut longueur et en course d'élèves de primaires à l'école *La Roussillonaise*, au début et à la fin d'un cycle d'athlétisme.

	Saut en longueur distance (m)		Course Temps (sec)	
	<i>Début</i>	<i>Fin</i>	<i>Début</i>	<i>Fin</i>
Garçons	5,60	5,70	143	151
	2,50	4,10	130	135
	3,80	4,50	123	134
	4,30	4,00	144	154
	5,90	5,90	121	124
	3,50	4,10	123	144
	5,50	5,80	134	140
Filles	6,30	7,00	123	122
	4,20	4,80	113	124
	4,50	5,20	124	129
	5,00	5,50	123	130
	3,20	3,40	132	134
	6,60	6,50	123	119
	6,20	6,60	140	134

Seuil de significativité : $p=0,05$

Peut-on dire que le premier garçon de la liste est meilleur en saut en longueur plutôt qu'en course au début du cycle ?

Quelles hypothèses et conclusions peut-on faire sur les performances des garçons entre le début et la fin du cycle en course ?

Loi normale réduite (Probabilités bilatérales)

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	1.00000	0.99202	0.98404	0.97607	0.96809	0.96012	0.95216	0.94419	0.93624	0.92829
0.1	0.92034	0.91241	0.90448	0.89657	0.88866	0.88076	0.87288	0.86501	0.85715	0.84931
0.2	0.84148	0.83367	0.82587	0.81809	0.81033	0.80259	0.79486	0.78716	0.77948	0.77182
0.3	0.76418	0.75656	0.74897	0.74140	0.73386	0.72634	0.71885	0.71138	0.70395	0.69654
0.4	0.68916	0.68181	0.67449	0.66720	0.65994	0.65271	0.64552	0.63836	0.63123	0.62413
0.5	0.61708	0.61005	0.60306	0.59611	0.58920	0.58232	0.57548	0.56868	0.56191	0.55519
0.6	0.54851	0.54186	0.53526	0.52869	0.52217	0.51569	0.50925	0.50286	0.49650	0.49019
0.7	0.48393	0.47770	0.47152	0.46539	0.45930	0.45325	0.44725	0.44130	0.43539	0.42953
0.8	0.42371	0.41794	0.41222	0.40654	0.40091	0.39532	0.38979	0.38430	0.37886	0.37347
0.9	0.36812	0.36282	0.35757	0.35237	0.34722	0.34211	0.33706	0.33205	0.32709	0.32217
1.0	0.31731	0.31250	0.30773	0.30301	0.29834	0.29372	0.28914	0.28462	0.28014	0.27571
1.1	0.27133	0.26700	0.26271	0.25848	0.25429	0.25014	0.24605	0.24200	0.23800	0.23405
1.2	0.23014	0.22628	0.22247	0.21870	0.21498	0.21130	0.20767	0.20408	0.20055	0.19705
1.3	0.19360	0.19020	0.18684	0.18352	0.18025	0.17702	0.17383	0.17069	0.16759	0.16453
1.4	0.16151	0.15854	0.15561	0.15272	0.14987	0.14706	0.14429	0.14156	0.13887	0.13622
1.5	0.13361	0.13104	0.12851	0.12602	0.12356	0.12114	0.11876	0.11642	0.11411	0.11183
1.6	0.10960	0.10740	0.10523	0.10310	0.10101	0.09894	0.09691	0.09492	0.09296	0.09103
1.7	0.08913	0.08727	0.08543	0.08363	0.08186	0.08012	0.07841	0.07673	0.07508	0.07345
1.8	0.07186	0.07030	0.06876	0.06725	0.06577	0.06431	0.06289	0.06148	0.06011	0.05876
1.9	0.05743	0.05613	0.05486	0.05361	0.05238	0.05118	0.05000	0.04884	0.04770	0.04659
2.0	0.04550	0.04443	0.04338	0.04236	0.04135	0.04036	0.03940	0.03845	0.03753	0.03662
2.1	0.03573	0.03486	0.03401	0.03317	0.03235	0.03156	0.03077	0.03001	0.02926	0.02852
2.2	0.02781	0.02711	0.02642	0.02575	0.02509	0.02445	0.02382	0.02321	0.02261	0.02202
2.3	0.02145	0.02089	0.02034	0.01981	0.01928	0.01877	0.01827	0.01779	0.01731	0.01685
2.4	0.01640	0.01595	0.01552	0.01510	0.01469	0.01429	0.01389	0.01351	0.01314	0.01277
2.5	0.01242	0.01207	0.01174	0.01141	0.01109	0.01077	0.01047	0.01017	0.00988	0.00960
2.6	0.00932	0.00905	0.00879	0.00854	0.00829	0.00805	0.00781	0.00759	0.00736	0.00715
2.7	0.00693	0.00673	0.00653	0.00633	0.00614	0.00596	0.00578	0.00561	0.00544	0.00527
2.8	0.00511	0.00495	0.00480	0.00465	0.00451	0.00437	0.00424	0.00410	0.00398	0.00385
2.9	0.00373	0.00361	0.00350	0.00339	0.00328	0.00318	0.00308	0.00298	0.00288	0.00279
3.0	0.00270	0.00261	0.00253	0.00245	0.00237	0.00229	0.00221	0.00214	0.00207	0.00200
3.1	0.00194	0.00187	0.00181	0.00175	0.00169	0.00163	0.00158	0.00152	0.00147	0.00142
3.2	0.00137	0.00133	0.00128	0.00124	0.00120	0.00115	0.00111	0.00108	0.00104	0.00100
3.3	0.00097	0.00093	0.00090	0.00087	0.00084	0.00081	0.00078	0.00075	0.00072	0.00070
3.4	0.00067	0.00065	0.00063	0.00060	0.00058	0.00056	0.00054	0.00052	0.00050	0.00048
3.5	0.00047	0.00045	0.00043	0.00042	0.00040	0.00039	0.00037	0.00036	0.00034	0.00033
3.6	0.00032	0.00031	0.00029	0.00028	0.00027	0.00026	0.00025	0.00024	0.00023	0.00022
3.7	0.00022	0.00021	0.00020	0.00019	0.00018	0.00018	0.00017	0.00016	0.00016	0.00015
3.8	0.00014	0.00014	0.00013	0.00013	0.00012	0.00012	0.00011	0.00011	0.00010	0.00010
3.9	0.00010	0.00009	0.00009	0.00008	0.00008	0.00008	0.00007	0.00007	0.00007	0.00007
4.0	0.00006	0.00006	0.00006	0.00006	0.00005	0.00005	0.00005	0.00005	0.00005	0.00004

Loi du *t* de Student (Probabilités bilatérales)

ddl \ Seuil	0.20	0.10	0.05	0.02	0.01	0.001	0.0001	0.00001
1	3.08	6.31	12.71	31.82	63.66	636.63	6366.84	63725.70
2	1.89	2.92	4.30	6.97	9.93	31.60	100.00	316.39
3	1.64	2.36	3.18	4.54	5.84	12.93	28.00	60.42
4	1.54	2.13	2.78	3.75	4.61	8.61	15.55	27.78
5	1.48	2.02	2.57	3.37	4.03	6.87	11.18	17.90
6	1.44	1.95	2.45	3.14	3.71	5.96	9.08	13.56
7	1.42	1.90	2.37	3.00	3.50	5.41	7.89	11.22
8	1.40	1.86	2.31	2.90	3.36	5.04	7.12	9.78
9	1.39	1.84	2.26	2.82	3.25	4.78	6.59	8.83
10	1.37	1.81	2.23	2.77	3.17	4.59	6.21	8.15
11	1.37	1.80	2.20	2.72	3.11	4.44	5.92	7.65
12	1.36	1.78	2.18	2.68	3.06	4.32	5.70	7.26
13	1.35	1.77	2.16	2.65	3.01	4.22	5.51	6.96
14	1.35	1.76	2.15	2.63	2.98	4.14	5.36	6.71
15	1.34	1.76	2.13	2.60	2.95	4.07	5.24	6.50
16	1.34	1.75	2.12	2.59	2.92	4.02	5.13	6.33
17	1.34	1.74	2.11	2.57	2.90	3.97	5.04	6.19
18	1.33	1.74	2.10	2.55	2.88	3.92	4.97	6.06
19	1.33	1.73	2.10	2.54	2.86	3.89	4.90	5.95
20	1.33	1.73	2.09	2.53	2.85	3.85	4.84	5.86
21	1.33	1.72	2.08	2.52	2.83	3.82	4.78	5.77
22	1.32	1.72	2.08	2.51	2.82	3.79	4.74	5.70
23	1.32	1.72	2.07	2.50	2.81	3.77	4.69	5.63
24	1.32	1.71	2.07	2.49	2.80	3.75	4.66	5.57
25	1.32	1.71	2.06	2.49	2.79	3.73	4.62	5.51
26	1.32	1.71	2.06	2.48	2.78	3.71	4.59	5.46
27	1.32	1.71	2.05	2.47	2.77	3.69	4.56	5.42
28	1.31	1.70	2.05	2.47	2.77	3.68	4.53	5.37
29	1.31	1.70	2.05	2.46	2.76	3.66	4.51	5.34
30	1.31	1.70	2.04	2.46	2.75	3.65	4.48	5.30
31	1.31	1.70	2.04	2.45	2.75	3.64	4.46	5.27
32	1.31	1.70	2.04	2.45	2.74	3.62	4.44	5.24
33	1.31	1.69	2.04	2.45	2.74	3.61	4.42	5.21
34	1.31	1.69	2.03	2.44	2.73	3.60	4.41	5.18
35	1.31	1.69	2.03	2.44	2.73	3.59	4.39	5.16
36	1.31	1.69	2.03	2.44	2.72	3.58	4.37	5.13
37	1.31	1.69	2.03	2.43	2.72	3.58	4.36	5.11
38	1.31	1.69	2.03	2.43	2.71	3.57	4.35	5.09
39	1.31	1.69	2.02	2.43	2.71	3.56	4.33	5.07
40	1.31	1.69	2.02	2.43	2.71	3.55	4.32	5.05
50	1.30	1.68	2.01	2.41	2.68	3.50	4.23	4.92
60	1.30	1.67	2.00	2.39	2.66	3.46	4.17	4.83
70	1.30	1.67	2.00	2.38	2.65	3.44	4.13	4.76
80	1.29	1.67	1.99	2.38	2.64	3.42	4.10	4.72
90	1.29	1.66	1.99	2.37	2.63	3.40	4.07	4.68
100	1.29	1.66	1.99	2.37	2.63	3.39	4.06	4.66
200	1.29	1.65	1.97	2.35	2.60	3.34	3.97	4.53
300	1.29	1.65	1.97	2.34	2.59	3.33	3.95	4.50
400	1.29	1.65	1.97	2.34	2.59	3.32	3.93	4.48
500	1.29	1.65	1.97	2.34	2.59	3.31	3.92	4.46
∞	1.28	1.64	1.96	2.33	2.58	3.29	3.89	4.42

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Année d'études : L2
Enseignant responsable : N CLARENS

Durée de l'épreuve : 1 heure 30
Documents autorisés : aucun

UE 49 : Outils et méthodes
EC 49 : Anglais

Sujet :

Imagine a press article in which you are a journalist making a parallel between these two yachswomen. What sort of advice do you think Ellen MacArtur could give to Liz Wardley and how would Ellen justify her choice of abandoning sailing? (200 words +/- 10%)

Read both documents:

Ellen MacArthur: 'I can't live with the sea any more'

The round the world record holder explains why she has turned her back on the sea to crusade for the planet.

Nothing mattered more to Ellen MacArthur than the sea, unless it was being the fastest person on its surface. It was her element, the great obsession from childhood. With the boats that took her round the world, she had a kind of symbiotic union. They worked as one. And when she was back on land, everyday life felt trivial, people pressed in too much, and she soon wanted to be out on the ocean again, testing herself against the elements even in places that had nearly destroyed her.

At the end of her Vendée Globe triumph in 2001, she took me down into the tiny, unventilated cabin of Kingfisher on a "tour" of the quarters which had been her cell, home, work station and survival-capsule for 94 days. She talked about the meticulous planning that had gone into provisioning her nutshell of a boat; how she worked out, to the last perforation, exactly how many kitchen rolls she would need.

Preparation was everything, she said. Proudly, she showed off her unappetising stash of foil-wrapped, freeze-dried food, the tiny one-foot gas stove, the neatly hanging polythene bags of medical supplies and rations – of which days 95-110 were untouched because she had got home so fast. Her housekeeping was as formidable as her sailing.

The boat was her world and she looked after it because her life depended on it. Now, she sees the world as a boat: a small, beautiful, damageable entity whose supplies are running out. "I wasn't looking for this," she pleads. "I didn't want to leave sailing. I just couldn't imagine it. I never thought it would stop for a second. I was even thinking of building a boat for the Vendée Globe 2008."

What happened? "Perhaps it's like loving someone so much but knowing that you simply can't live with them any more," she says. "I just knew I couldn't go on as before." She remembers standing at Les Sables d'Olonne watching the boats in the 2008 Vendée slip away to the start line when it struck her that she would never compete again. "I knew that the impossible had happened. My racing years were over. I still felt as much in love with the sea as ever, but something inside me had grown to eclipse that passion.

By Elizabeth Grice, 31 Aug 2010

The sailor Liz Wardley has just announced she will be taking part in the 2012 -2013 Vendée Globe

Liz Wardley has therefore become the second woman to sign up after Samantha Davies, taking the total number to seventeen skippers. Liz will be joining Jean-Baptiste's ocean racing team in Lorient, to get some help during the preparation phase.

Originally from Papua – New Guinea, bursting with energy, this rather short lady is a determined racer and a true adventurer. She built up a solid reputation in ocean racing circles over the past few years thanks to her fighting spirit and experience: World Hobie-Cat vice-champion in 1998, she took part in the 2000-2001 Volvo Ocean Race on board Amer Sports Too. In 2002, she built a Mini 6.50 prototype in New Zealand, before taking part for several seasons in the Figaro circuit. Liz Wardley: "Lining up for the start of the Vendée Globe this year is fantastic and unexpected. I was looking for sponsors for a transatlantic crossing aboard a dugout canoe and ended up finding a partner for three seasons. I shall be joining a team that will ensure I can prepare for the race in the best possible conditions. It would be something of an exaggeration to say that the Vendée Globe was a childhood dream, as when I started to sail in Australia, the race wasn't that well known there. Since I have been living in France and I have been racing solo, the Vendée has become a goal for me. I can't wait to get out there training. I shall be setting out in this Vendée Globe as a genuine racer, with my first goal to get all the way around and complete the race, which is something you have to do before looking at your result."

20 POINTS

(10 points for ideas; 5 points for vocabulary; 5 points for grammar)