

Travaux Dirigés n° 4 : Régression linéaire simple – partie III

Objectifs : construire un intervalle de confiance.

On considère le modèle de régression linéaire simple $\mathbf{y} = \beta_1 + \beta_2 \mathbf{x} + \epsilon$. Soit un échantillon $(x_i, y_i)_{1 \leq i \leq 100}$ de statistiques résumées

$$\sum_{i=1}^{100} x_i = 0, \sum_{i=1}^{100} x_i^2 = 400, \sum_{i=1}^{100} x_i y_i = 100, \sum_{i=1}^{100} y_i = 100, \hat{\sigma}^2 = 1.$$

- Exprimer les intervalles de confiance à 95% pour β_1 et β_2 en vous servant de la table des quantiles de la loi de Student.

n / q	0.75	0.8	0.85	0.9	0.95	0.975	0.99	0.995	0.9995
1	1	1.376	1.963	3.078	6.314	12.706	31.821	63.657	636.619
2	0.816	1.061	1.386	1.886	2.92	4.303	6.965	9.925	31.599
3	0.765	0.978	1.25	1.638	2.353	3.182	4.541	5.841	12.924
4	0.741	0.941	1.19	1.533	2.132	2.776	3.747	4.604	8.61
5	0.727	0.92	1.156	1.476	2.015	2.571	3.365	4.032	6.869
6	0.718	0.906	1.134	1.44	1.943	2.447	3.143	3.707	5.959
7	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	5.408
8	0.706	0.889	1.108	1.397	1.86	2.306	2.896	3.355	5.041
9	0.703	0.883	1.1	1.383	1.833	2.262	2.821	3.25	4.781
10	0.7	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.587
11	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.437
12	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	4.318
13	0.694	0.87	1.079	1.35	1.771	2.16	2.65	3.012	4.221
14	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	4.14
15	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	4.073
16	0.69	0.865	1.071	1.337	1.746	2.12	2.583	2.921	4.015
17	0.689	0.863	1.069	1.333	1.74	2.11	2.567	2.898	3.965
18	0.688	0.862	1.067	1.33	1.734	2.101	2.552	2.878	3.922
19	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.883
20	0.687	0.86	1.064	1.325	1.725	2.086	2.528	2.845	3.85
21	0.686	0.859	1.063	1.323	1.721	2.08	2.518	2.831	3.819
22	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.792
23	0.685	0.858	1.06	1.319	1.714	2.069	2.5	2.807	3.768
24	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.745
25	0.684	0.856	1.058	1.316	1.708	2.06	2.485	2.787	3.725
26	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.707
27	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.69
28	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.674
29	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.659
30	0.683	0.854	1.055	1.31	1.697	2.042	2.457	2.75	3.646
40	0.681	0.851	1.05	1.303	1.684	2.021	2.423	2.704	3.551
50	0.679	0.849	1.047	1.299	1.676	2.009	2.403	2.678	3.496
60	0.679	0.848	1.045	1.296	1.671	2	2.39	2.66	3.46
80	0.678	0.846	1.043	1.292	1.664	1.99	2.374	2.639	3.416
100	0.677	0.845	1.042	1.29	1.66	1.984	2.364	2.626	3.39
120	0.677	0.845	1.041	1.289	1.658	1.98	2.358	2.617	3.373