Feuille d'exercice n° 26 : **Séries numériques - fiche d'entraînement**

Exercice 1 Étudier la nature de la série de terme général u_n :

1. $u_n = \dfrac{n+1}{n^3-7}$
2. $u_n = \dfrac{n+1}{n^2-7}$
3. $u_n = \dfrac{n+1}{n-7}$
4. $u_n = \sin\left(\frac{1}{n^2}\right)$
5. $u_n = \dfrac{1}{n^{1+1/\sqrt{n}}}$
6. $u_n = \dfrac{1}{\ln(n^2+2)}$
7. $u_n = \dfrac{\ln n}{n^{3/2}}$
8. $u_n = \dfrac{n}{2^n}$
9. $u_n = \dfrac{2^n+3^n}{n^2+\ln n+5^n}$
10. $u_n = \dfrac{1}{n!}$
11. $u_n = \dfrac{n^{10000}}{n!}$
12. $u_n = \dfrac{4^{n+1}((n+1)!)^2}{(2n-1)!}$
13. $u_n = \left(\sin\left(\frac{1}{n}\right)\right)^n$
14. $u_n = \left(1-\frac{1}{n}\right)^{n^2}$
15. $u_n = \left(1+\frac{1}{n}\right)^{n^2}$
16. $u_n = \ln\left(\dfrac{n^2+n+1}{n^+n-1}\right)$
17. $u_n = \dfrac{1}{n+(-1)^n\sqrt{n}}$
18. $u_n = \left(\dfrac{n+3}{2n+1}\right)^{\ln n}$
19. $u_n = \dfrac{1}{\ln(n)\ln(\operatorname{ch} n)}$
20. $u_n = \arccos\sqrt[3]{1-\frac{1}{n^2}}$
21. $u_n = \dfrac{n^2}{(n-1)!}$
22. $u_n = (\cos(1/\sqrt{n}))^n - \dfrac{1}{\sqrt{\mathrm{e}}}$
23. $u_n = \ln\left(\dfrac{2}{\pi}\arctan\dfrac{n^2+1}{n}\right)$
24. $u_n = \displaystyle\int_0^{\pi/2} \frac{\cos^2 x}{n^2+\cos^2 x}\,\mathrm{d}x$
25. $u_n = n^{-\sqrt{2}\sin(\pi/4+1/n)}$
26. $u_n = \mathrm{e} - \left(1+\frac{1}{n}\right)^n$