해석학 1 (타전공 학생용) 과제4

1. Show that $\sum a_n$: conditionally converges $\Rightarrow$ $\sum a_n^+ = \infty$ & $\sum a_n^- = \infty$

   Here

$$a_n^+ = \begin{cases} a_n & \text{if } a_n > 0 \\ 0 & \text{if } a_n \le 0 \end{cases} \quad \text{and} \quad a_n^- = \begin{cases} 0 & \text{if } a_n > 0 \\ -a_n & \text{if } a_n \le 0 \end{cases}$$

2. Test for **conditional convergence** of the series $\sum_{n=2}^{\infty} (-1)^n (\sqrt[n]{n} - 1)$

3. Prove that $\sum_{n=1}^{\infty} \frac{\cos n}{n}$ & $\sum_{n=1}^{\infty} \frac{\sin n}{n}$ are both convergent

4. If $\sum_{n=1}^{\infty} a_n$ is convergent, show that $\sum_{n=1}^{\infty} a_n \frac{n^{2021}}{e^n}$ is convergent