Sequences & Series: Exercise 2

Due date: 2025-12-09

1. Judge the convergence of the series $\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$. If it converges, find its sum.

2. Judge the convergence of the series $\sum_{n=1}^{\infty} \frac{1}{n^2}$ (Hint: you can make use of the convergence conclusion of p-harmonic series).

3. Judge the convergence of the series$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$ (Hint: you can make use of the convergence conclusion of p-harmonic series).

4. Judge the convergence of the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$, including the situations of absolute convergence and conditional convergence.

5. Judge the convergence of the series using the ratio test: $\sum_{n=1}^{\infty} \frac{n}{2^n}$.