

Math 102 — Absolute convergence test and alternating series test

Problem 1. For each of the following series, explain whether the absolute convergence test can be used to prove it converges. If it cannot be used, prove the series converges using the alternating series test. Finally, state whether the series converges absolutely or converges conditionally.

a. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n^4}$

b. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n^{1/4}}$

c. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{n^2+5}{n^6+n^2+1}$

d. $\sum_{n=1}^{\infty} (-1)^n \frac{1}{(n+3)^{1/3}}$

e. $\sum_{n=1}^{\infty} (-1)^n \frac{n}{\sqrt{n^5+2}}$

f. $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n^2+6}}$