

Does $\sum_{n=1}^{\infty} \frac{2^n}{3^n}$ diverge, converge absolutely, or converge conditionally?

Solution

$\sum_{n=1}^{\infty} \frac{2^n}{3^n} = \sum_{n=1}^{\infty} \left(\frac{2}{3}\right)^n$ is a geometric series with $r = \frac{2}{3}$. Since $|r| < 1$, the series $\sum_{n=1}^{\infty} \frac{2^n}{3^n}$ converges by the Geometric Series Test.

Since $\sum |a_n| = \sum a_n$, the series $\sum_{n=1}^{\infty} \frac{2^n}{3^n}$ converges absolutely.