- 1. Determine whether the series converges absolutely or conditionally.
- (a) $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n}}$

(b) $\sum_{n=1}^{\infty} \frac{\sin(n)}{2^n}$

(c) \(\sum_{n=1}^{\infty} \frac{1}{2^n} \)

2. Convergent or divergent? (If convergent, is it absolutely so?)

(a)
$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{3^n}{2^n n^3}$$

(b)
$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{2^n}{3^n n^3}$$

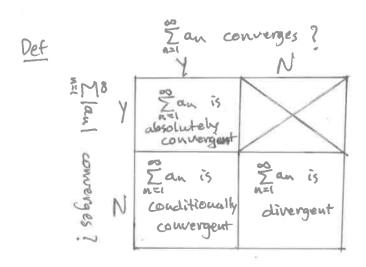
$$(C) \sum_{n=1}^{\infty} \frac{1}{n!}$$

(d)
$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n}$$

(e)
$$\sum_{n=1}^{\infty} \left(\frac{n^2+1}{2n^2+1} \right)^n$$

$$(f)$$
 $\sum_{n=1}^{\infty} \frac{n!}{n^n}$

Theorem If $\sum_{n=1}^{\infty} |a_n|$ converges, then $\sum_{n=1}^{\infty} a_n$ converges.



The ratio test (1) If $\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| < 1$, then $\sum_{n=1}^{\infty} a_n$ is absolutely conv.

(2) If $\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| > 1$ or $=\infty$, then $\sum_{n=1}^{\infty} a_n$ is divergent.

(else inconclusive)

The root test (1) If lim |an11/1/21, then I am is absolutely conv.

(2) If $\lim_{n\to\infty} |a_n|^{1/n} > 1$, then $\sum_{n=1}^{\infty} a_n$ is divergent.

(else inconclusive)

Rearrangements If $\sum_{n=1}^{\infty}$ and is conditionally conv. and relk, then there is a rearrangement $\{b_n\}$ of $\{a_n\}$ with $\sum_{n=1}^{\infty}$ $b_n = V$. (!)