Today's topics and news

- Topic: Alternating series
- **Homework:** Watch video 13.15 (13.16 and 13.17 are supplementary).

Rapid questions: alternating series test

Convergent or divergent?

1. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^{0.5}}$
2. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^{3}}$
3. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{\sin n}$
4. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{0.5}}$
5. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{3}}$
6. $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{\sin n}$

An Alternating Series Test example

Verify carefully the 3 hypotheses of the Alternating Series Test for

$$\sum_{n=0}^{\infty} (-1)^n \frac{n-\pi}{e^n}$$

Can we conclude it is convergent?

Estimation

Estimate the sum

$$S = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!}$$

with an error smaller than 0.001. Write your final answer as a rational number (i.e. as a quotient of two integers).

Abstract use of convergence tests

We know

- $\forall n \in \mathbb{N},\ a_n > 0.$
- the series $\sum_{n}^{\infty} a_n$ is convergent

Determine whether the following series are convergent, divergent, or we do not have enough information to decide:

1. $\sum_{n}^{\infty} \sin a_n$
2. $\sum_{n}^{\infty} \cos a_n$
3. $\sum_{n}^{\infty} \sqrt{a_n}$
4. $\sum_{n}^{\infty} (a_n)^2$