MATH 5B - Single Variable Calculus II Spring 2019

§11.5 Alternating Series

In-class Activity 11.5

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Activity 1:

Show that the alternating harmonic series,

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

converges.

Activity 2:

Determine whether or not the following series converge or diverge.

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

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

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

(a) $\displaystyle\sum_{n=1}^{\infty}(-1)^n \frac{1}{n!}$

(b) $\displaystyle\sum_{n=1}^{\infty}(-1)^n \frac{\ln(n)}{n}$

(c) $\displaystyle\sum_{n=1}^{\infty}(-1)^n \cos\left(\frac{\pi}{n}\right)$

Activity 3:

Determine whether the series converges or diverges:

$$\sum_{j=1}^{\infty}(-1)^{j+1}\frac{j}{j^2+j+1}$$

Activity 4:

Find the sum of the alternating harmonic series

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

correct to 3 decimal places using Sage.