

## HOMEWORK FOR THE LECTURE ON NOV 30

1. Determine whether each of the following series converges or diverges. If the series converges, determine whether it converges absolutely. Justify your answers.

(a)

$$\sum_{k=1}^{\infty} \frac{k!}{1 \cdot 3 \cdot 5 \cdots (2k-1)}$$

(b)

$$\sum_{k=1}^{\infty} (\sqrt{k} - \sqrt{k-1})^k$$

(c)

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

(d)

$$\sum_{k=1}^{\infty} (-1)^k \frac{\sin(\pi k/2)}{k\sqrt{k}}$$

2. Let  $L$  be the sum of the infinite series  $\sum_{k=0}^{\infty} (-1)^k \frac{1}{k!}$ .

- (a) Use the formula for the error term in an alternating series to find a value of  $n$  for which you know that the  $n^{\text{th}}$  partial sum  $s_n$  of this series approximates  $L$  to within 2 decimal places.
- (b) What is the exact value of  $L$ ?