

## PROBLEM SET 14: ALTERNATING SERIES

Note: Most of the problems were taken from the textbook [1].

**Problem 1.** *Test the series for convergence or divergence.*

a)  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{3+5n}$ ;

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

c)  $\sum_{n=1}^{\infty} \frac{(-1)^n n}{e^n}$ ;

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

e)  $\sum_{n=1}^{\infty} \frac{n \cos \pi n}{2^n}$ ;

f)  $\sum_{n=1}^{\infty} (-1)^n \cos(\pi/n)$ ;

g)  $\sum_{n=1}^{\infty} (-1)^n \sin(\pi/n)$ ;

h)  $\sum_{n=1}^{\infty} (-1)^n \frac{n^n}{n!}$ ;

i)  $\sum_{n=1}^{\infty} (-1)^n (\sqrt{n+1} - \sqrt{n})$ .

**Problem 2.** *Approximate the sum of the series correct to four decimal places.*

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

b)  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^6}$ ;

c)  $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n4^n}$ .

## REFERENCES

- [1] J. Stewart: *Single Variable Calculus* 8th Edition, Cengage Learning, Boston 2015.