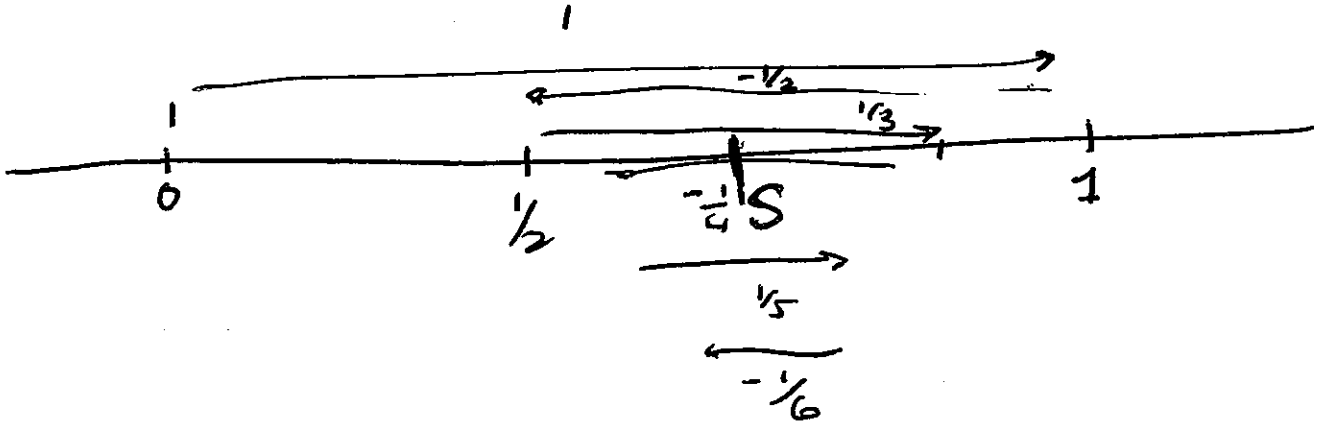
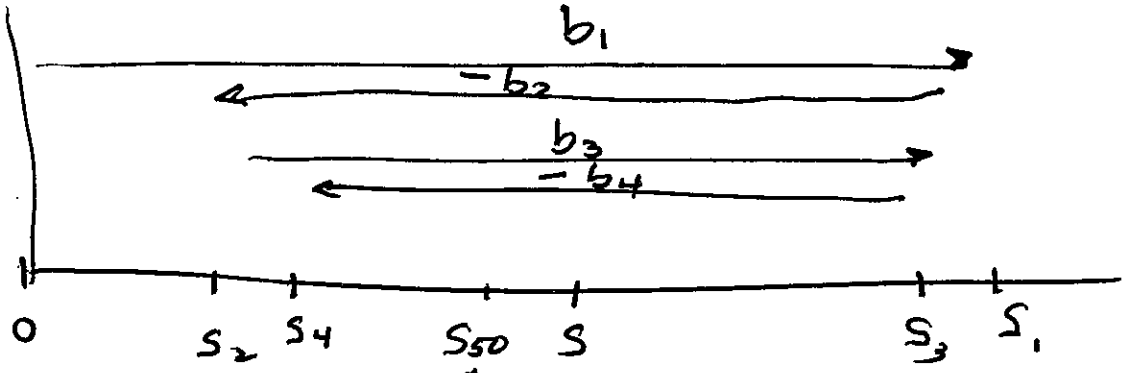
§11.5 #31 Is The 50th partial sum of the alternating series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n}$ an overestimate or an understimate of the total sum? Explain.

SOLUTION

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n} = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} \cdots + \frac{1}{49} - \frac{1}{50} + \cdots$$

$$S_{50} = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} + \ldots + \frac{1}{49} - \frac{1}{50}$$





the even's are an underestimate of the sum.

§11.5 # 33 $\sum_{n=1}^{\infty} \frac{(-1)^n}{n+p}$

For which values of p is the series convergent?

Alternating Series Test

$b_n = \frac{1}{n+p}$

(i) $\lim_{n\to\infty} \frac{1}{n+p} = 0$

(ii) $b_{n+1} \leq b_n$

$\frac{1}{n+1+p} \leq \frac{1}{n+p}$

$n+p \leq n+1+p$

$0 \leq 1$ ✓

~~Conv. for all p~~

- p is not a negative integer.