MAC2312: Calculus 2 - Section 3

Quiz 17: 11.5 The Alternating Series Test — July 28, 2015

1. Determine whether the following series is convergent or divergent.

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

A. convergent

B. divergent

The series is alternating. For $b_n = e^{-n}$,

(i) $e^{-(n+1)} < e^{-n}$ for all n since $f(x) = e^{-x}$ has negative derivative $f'(x) = -e^{-x}$, i.e. f is decreasing for all real x, and

(ii) $e^{-n} \to 0$ as $n \to \infty$.

Therefore, the series is convergent by the Alternating Series Test.