

§14, 15 More series tests, Alternating series

We've talked about proving convergence for series with all positive terms. How do we handle series that have negative terms?

Theorem (Absolute convergence test) If  $\sum |c_n|$  converges, then  $\sum c_n$  converges.

Proof Observe that

$$0 \leq |c_n| + c_n \leq 2|c_n|.$$

By comparison test  $\sum [|c_n| + c_n]$  converges since  $\sum 2|c_n|$  converges. Therefore, since

$$\sum c_n = \sum (|c_n| + c_n) - \sum |c_n|$$

is the difference of convergent series,  $\sum c_n$  converges,

See Series worksheet solutions for  
other problems discussed.