

## Lecture 23: March 1, 2016

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## 23.1 Sequences Continued

**Theorem 23.1** *Monotonic Sequence Theorem (MST)**If a sequence is bounded and monotonic, then it is convergent*

A sequence is :

- Increasing if  $a_n < a_{n+1}$  for all  $n \geq 1$
- Decreasing if  $a_n > a_{n+1}$  for all  $n \geq 1$
- Monotonic if its either increasing or decreasing
- Bounded above if there is a number  $M$  such that  $a_n \leq M$  for all  $n \geq 1$
- Bounded below if there is a number  $M$  such that  $a_n \geq M$  for all  $n \geq 1$
- Bounded if it is both bounded above and below

## 23.2 Series

An infinite series (or just a series) is what we obtain if we take the terms of a sequence  $\{a_n\}$  and add them together

$$\sum_{n=1}^{\infty} a_n = a_1 + a_2 + \dots + a_n + \dots$$

Notes :

1. We also the notation  $\sum a_n$
2.  $\sum_{n=1}^{\infty} a_n = \sum_{i=1}^{\infty} a_i = \sum_{k=1}^{\infty} a_k$

**End of Lecture Notes**  
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