Overview of Section

Part 1

- Sequences - what are sequences?
- Arithmetic Progressions
- Geometric Progressions
- Recurrences Relationships (Fibonacci Sequence)

Proof by Induction : three steps

- Step 1 : Base Case
  - Demonstrate for $n = 1$.
  - Normally a simple calculation.
- Step 2 : Induction Hypothesis
  - State assumption for $n = k$
  - Can extend assumption of statement for $n = k - 1$ in the case of multi-phase recurrence rules
  - For example, u_{n+1} is evaluated by u_n and u_{n-1}, the two previous terms.
- Step 3 : Induction Step.
  - Demonstrate for $n = k + 1$.
  - This state is main computational component of Proof by Induction method

Sigma Notation

Three Important Summation Identities

index term = i , Number of terms = n

- Identity 1

$$\sum_{i=1}^{i=n} 1 = n$$

- Identity 2

$$\sum_{i=1}^{i=n} i = \frac{n(n+1)}{2}$$

- Identity 3

$$\sum_{i=1}^{i=n} i^2 = \frac{(2n+1)(n+1)(n)}{6}$$