Differential Equations

Presentation Subtopics for Group Members

Odd and Even Functions with their Fourier Series, Half range Expansion of Fourier Series.

1. Introduction to Odd and Even Functions **(Sayeed Tauheed Shah 14143)**
   * Definition of odd and even functions.
   * Graphical representation and symmetry properties.
   * Key mathematical properties.
   * Behavior under addition, multiplication, and integration.
   * Real-world examples of odd and even functions.
2. Introduction to Fourier Series **(Taimoor Ul Islam 14031)**
   * What is a Fourier series?
   * Decomposition of functions into sines and cosines.
   * Importance and applications in engineering, physics, and signal processing.
3. Fourier Series for Odd and Even Functions **(Hamad Motu)**
   * Simplification of Fourier series for odd functions (sine series).
   * Simplification of Fourier series for even functions (cosine series).
   * Step-by-step derivation for both cases.
4. Half-Range Expansions of Fourier Series **(Shayan)**
   * Definition and significance of half-range expansions.
   * Applications in representing non-periodic functions over a finite interval.
   * Deriving half-range sine and cosine series.
5. Comparison and Applications **(Hamad Ali)**
   * Comparison between full-range and half-range Fourier expansions.
   * Examples of where odd/even Fourier series are used in real-world problems.
6. Visual and Practical Examples **(Amaar)**
   * Demonstration with graphs of odd and even functions and their Fourier series.
   * Numerical examples to illustrate half-range expansions.
7. Conclusion **(Amaar)**
   * Summary of the key concepts.
   * Significance of odd and even functions in simplifying Fourier analysis.
   * Applications of Fourier series in modern science and engineering.