2017 Summer Camp Analysis Syllabus

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Tentative Schedule of Topics
Week 1
Introduction and Overview; Exponential function e^x; e^{rx} as an eigen-function of $\frac{d}{dx}$; Differential equations; Oscillation, trigonometric functions and complex exponential e^z; Mass-Spring-Dashpot model and 2nd order differential equations;
Week 2
Input-Response scheme; Exponential Response Formula (ERF); Complex ERF; Resonance (Research Project); Impulse and Step input response;
Week 3
Fourier Series: Vector spaces and function spaces, inner product and orthonormal basis (importance of oscillation); Idea of superposition; Convergence of Fourier Series; Applications on heat transfer and resonance;
Week 4
Fourier Transform: Ideas (as generalization of Fourier coefficients and time-frequency relation); Definition and formulas; Solving differential equations