

NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING  
SEMINAR

*Identifying Differential Equations with Numerical Time  
evolution*

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**Abstract:** Identifying unknown differential equations from given discrete time dependent data is a challenging problem. A small amount of noise can make the recovery unstable, and nonlinearity and differential equations with varying coefficients add complexity to the problem. We propose a new direction based on the fundamental idea of convergence analysis of numerical partial differential equation schemes. We utilize L1 minimization for efficiency, and a performance guarantee is established based on an incoherence property. The main contribution is to validate and correct the results by Time Evolution Error and Base Element Expansion. The propose method is explored for data with non-periodic boundary conditions, noisy data and PDE with varying coefficient for nonlinear PDE identification.

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MATHEMATICS  
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