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Computational and Analytical Modeling of Physical System Via Ordinary Differential Equations

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Abstract: *Ordinary Differential Equations (ODEs) are fundamental tools for modeling and analyzing physical systems in science and engineering. They describe system variables change with respect to time or space. This explores both analytical and computational approaches to solving ODEs in physical system modeling. Analytical methods provide exact solutions and theoretical insights while computational techniques offer approximate solutions for complex systems. The integration of these approaches enhances accuracy, efficiency and applicability in real-world problems. This highlights methodologies, applications and future advancements in modeling physical systems using ODEs. This presents a combined analytical and computational approach for modeling such systems.*

Keywords: Ordinary Differential Equations, Physical Systems, Analytical Methods, Numerical Methods & Modeling