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Notice for the PhD Viva Voce Examination

Ms Sherly K, Registration Number: 2370062, PhD Scholar at the Department of Mathematics, School of Sciences, CHRIST (Deemed to be University), will defend her PhD thesis at the public viva-voce examination on Tuesday, 27 October 2026, at 02.00 pm in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis	:	**Dynamic Modeling of Environmental Sustainability Strategies Using Fractional Derivatives**
Discipline	:	**Mathematics**
External Examiner - I	:	**Dr D G Prakasha** Professor Department of Mathematics Davangere University Shivagangothri Davangere - 577007 Karnataka
External Examiner - II	:	**Dr Lanre Akinyemi** Associate Professor Department of Mathematics Prairie View A&M University Memorial Student Center, 100 University Dr Suite 221 Prairie View, TX 77446 United States
Supervisor	:	**Dr Pundikala Veeresha** Associate Professor Department of Mathematics School of Sciences CHRIST (Deemed to be University) Bengaluru - 560029 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts, and research scholars of all the branches of research are cordially invited to attend this open viva–voce examination.

Registrar (Academics)

Place: Bengaluru
Date: 22 October 2026

ABSTRACT

Environmental sustainability has become a global priority due to the growing impacts of climate change, pollution, resource depletion, rapid urbanization, and technological advancement. This thesis presents a unified mathematical model-ing framework for investigating complex environmental and socio-technological systems using integer-order, fractional-order, fuzzy fractional, and stochastic differential equations to capture nonlinear dynamics, uncertainty, and mem-ory effects. Theoretical analyses establish the boundedness, existence, unique-ness, and stability of the proposed models, while advanced numerical methods are employed for efficient simulations. Parameter sensitivity analysis and ma-chine learning techniques, including Random Forest, ARIMA, and Prophet, are integrated to enhance predictive accuracy and system analysis. The find-ings demonstrate that the proposed hybrid framework provides an effective approach for understanding and predicting the dynamics of complex environmental systems, thereby contributing to environmental sustainability and informed decision-making in environmental management.

Keywords: Environmental Sustainability; Fractional Differential and Stochastic Equations; Mathematical Modeling; Machine Learning; Numerical Methods.

Publications:

1. **K. Sherly** and P. Veeresha,"Mathematical model for effective CO2 emis-sion control with forest biomass using fractional operator," Modeling Earth Systems and Environment, vol. 10, no. 4, pp. 5469-5488, 2024.
2. **K. Sherly** and P. Veeresha, "Fractional operator-based mathematical model for hydrological cycle analysis with machine learning integration," Modeling Earth Systems and Environment, vol.11, no.3, pp.1-20, 2025.
3. **K. Sherly**, P. Veeresha, Haci Mehmet Baskonus, "On the Investigation of Environmental Effects of ChatGPT Usage via the Newly Developed Math-ematical Model in Caputo Sense," Fractals and Fractionals, vol.10, no.3, pp.184, 2026.
4. **K. Sherly**, P. Veeresha, "Mathematical Modeling of the Dynamics of Plastic Production and Recycling under Environmental Constraints", Dis-cover Applied Sciences, vol.08, no.6, 2026.
5. **K. Sherly**, P. Veeresha, "Nonlinear Dynamics and Control of CO2 Driven Climate Variability and Ocean Heat Feedbacks", Earth Systems and Environment, vol.10, no.3, pp.1-27, 2026.
6. **K. Sherly**, P. Veeresha, "Nonlinear fractional and stochastic dynam-ics of air pollution and mortality with data-driven forecasting", Physica Scripta, vol.101, no.22, pp.225207, 2026.