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Open Invited Track

Fractional elements in mathematical models for epidemiology

Fractional calculus offers a promising framework for incorporating memory and hereditary effects into epidemiological models, capturing nonlocal interactions and long-term dependencies more effectively than classical approaches. However, the mere generalization of integer-order models to their fractional counterparts does not guarantee epidemiological validity. This raises a critical question: how should fractional elements be meaningfully integrated into models of disease dynamics? In this special session, we invite contributions that critically examine and advance the theoretical foundations of fractional epidemiological modeling, aiming to foster rigorous discussion on biologically consistent formulations and their implications.

Open Invited Track identification code: 8p5n4

Topics include:

Compartmental models;

Deterministic and stochastic models;

Heterogeneous mixing;

Vector-borne disease methods;

Advanced Modeling Topics (meta-population models, age

structured models, spatial models and diffusion);

Data Integration and Model Calibration;

Policy and Intervention Modeling;

Challenges and Future Directions in the fractional approximation of Epidemiological Models.

Key dates:

30 June 2025 - Paper submission deadline
15 September 2025 - Notification of acceptance
15 October 2025 - Final paper submission deadline

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13th IFAC Conference on Fractional Differentiation and its Applications
December 16-18 2025, Algiers, Algeria

ICFDA Algiers 2025