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Physics Informed Neural Networks for Fractional Logistic Growth Models

We present fractional physics-informed neural networks (fPINNs) for solving generalized logistic growth models governed by the Atangana-Baleanu fractional derivative and proportional delay. By combining automatic differentiation with numerical quadrature for the nonlocal Mittag-Leffler kernel, fPINNs can accurately captures memory-dependent and time-lagged dynamics. We show an application in epidemiology, where fPINNs can be used to infer hidden growth rates and memory effects from limited time-series data of infectious disease outbreaks.