

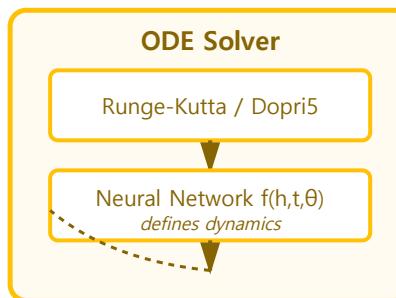
Neural ODEs for Continuous Medical Modeling

Continuous Dynamics: $dh/dt = f(h, t, \theta)$

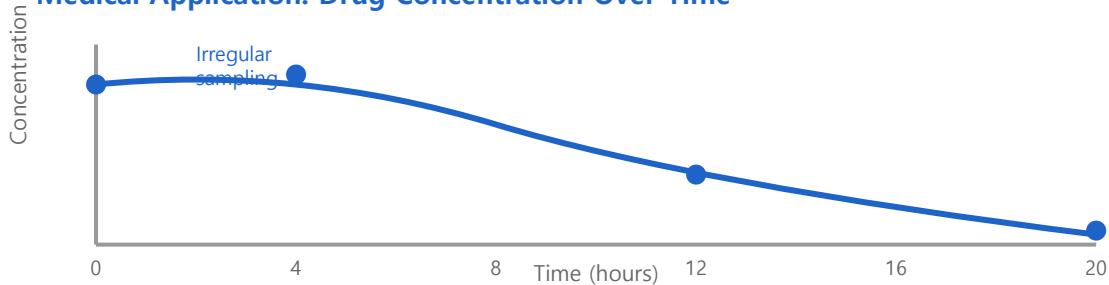
Discrete ResNet:



Neural ODE:



Medical Application: Drug Concentration Over Time



ODE Formulation

- Model continuous dynamics
- $dh/dt = f(h, t, \theta)$
- Infinite-depth networks

Training Method

- Adjoint sensitivity
- Memory-efficient backprop
- $O(1)$ memory complexity

Medical Models

- Pharmacokinetics (PK)
- Disease progression
- Tumor growth dynamics

Key Benefits

- Irregular time sampling
- Uncertainty quantification
- Physics-informed priors

Continuous Dynamics

Neural ODEs naturally model continuous physiological processes, enabling accurate predictions between sparse observations and **physically plausible interpolations** for medical time-series data.