引言

（1）Lumped水文模型发展

传统概念性水文模型=>深度学习模型=>physical-informed NN模型

（2）模型框架

Superflexpy,MARRMot,RAVEN

针对PINN-Hydrology的搭建框架的空缺，本论文提出了一个开源、灵活、高效、简单的模型搭建框架，用于概念水文模型搭建、简单的深度学习水文模型、物理驱动水文模型的搭建和参数优化，以此支撑未来PINN-Hydrology的发展和后续PINN-半分布式水文模型的开发。

* The modeling framework is flexible and straightforward, requiring only the provision of calculation formulas. Various construction methods are supported.
* There is no need to provide actual parameter values for model construction. Model parameters are only required during model computation, ensuring high decoupling between model construction, computation, and optimization.
* The modeling framework is based on the Julia language, leveraging its mature scientific computing ecosystem for high computational efficiency. It supports solving various ordinary differential equations and parameter optimization problems.
* The modeling framework caters to diverse construction needs, offering special functions for constructing neural networks, unit hydrographs, and other specialized requirements. It effectively supports the construction of emerging models like Physics-Informed Neural Networks (PINNs).