

## MindSporeHPC&强化学习类网络模型任务书

### 1. 任务描述

基于MindSpore框架，在昇腾平台上，迁移/开发下面任务清单的模型，实现其功能，并达到精度及性能要求。

### 2. 知识背景要求

语言要求：Python

专业知识：MindSpore 或 TF/PT 使用经验，深度学习算法，了解框架算子开发更优

### 3. 任务要求

项目周期：2-6 个月

功能要求：实现网络功能，精度达到交付要求（交付要求请与对接工程师沟通）

性能要求：性能交付要求请与对接工程师沟通

规范要求：优先遵循开源代码风格，符合 pep8 编码规范，符合交付件要求（交付规范细节请与对接工程师沟通）

### 4. 任务清单

序号	模型名称	论文链接	开源链接	交付要求	目标交付时间
1	FermiNet	Ab initio solution of the many-electron Schrödinger equation with deep neural networks	<a href="https://github.com/deepmind/ferminet">https://github.com/deepmind/ferminet</a>	精度+性能+310 推理	2021/8/15
2	PauliNet	Deep neural network solution of the electronic Schrödinger equation	<a href="https://github.com/deepqmc/deepqmc">https://github.com/deepqmc/deepqmc</a>	精度+性能+310 推理	2021/8/15
3	DeepMD-Cu	DeepPMD-kit: A deep learning package for many-body potential energy	<a href="https://github.com/deepmodeling/deepmd-kit">https://github.com/deepmodeling/deepmd-kit</a>	精度+性能+310 推理	2021/8/15

		representation and molecular dynamics			
4	DeepMD-H2O	DeepMD-kit: A deep learning package for many-body potential energy representation and molecular dynamics	<a href="https://github.com/deepmodeling/deepmd-kit">https://github.com/deepmodeling/deepmd-kit</a>	精度+性能+310 推理	2021/8/15
5	MeshingNet	MeshingNet: A New Mesh Generation Method Based on Deep Learning	无	精度+性能+310 推理	2021/8/15
6	PINNs Navier-Stokes	PINNs: Physics-informed neural networks: A deep learning framework for solving forward and inverse problems involving nonlinear partial differential equations PPINN: Parareal Physics-Informed Neural Network for time-dependent PDEs	<a href="https://github.com/maziarraissi/PINNs/tree/master/main">https://github.com/maziarraissi/PINNs/tree/master/main</a>	精度+性能+310 推理	2021/8/15
7	PINNS for 电磁	Deep Physical Informed Neural Networks for Metamaterial Design	<a href="https://github.com/lululxvi/deepxde">https://github.com/lululxvi/deepxde</a>	精度+性能+310 推理	2021/8/15
8	Schrodinger	PINNs: Physics-informed neural networks: A deep learning framework for solving forward and inverse problems involving nonlinear partial differential equations PPINN: Parareal Physics-Informed	<a href="https://github.com/maziarraissi/PINNs/tree/master/main">https://github.com/maziarraissi/PINNs/tree/master/main</a>	精度+性能+310 推理	2021/8/15

		Neural Network for time-dependent PDEs			
9	Heat transfer	<p>1 A Physics-Informed Machine Learning Approach for Solving Heat Transfer Equation in Advanced Manufacturing and Engineering</p> <p>2 Applications Physics Informed Neural Networks for Simulating Radiative Transfer</p>	<a href="https://github.com/mrobertol66/RadiativeTransportPinns">https://github.com/mrobertol66/RadiativeTransportPinns</a>	精度+性能+310 推理	2021/8/15
10	Kdv	<p>PINNs: Physics-informed neural networks: A deep learning framework for solving forward and inverse problems involving nonlinear partial differential equations</p> <p>PPINN: Parareal Physics-Informed Neural Network for time-dependent PDEs</p>	<a href="https://github.com/maziarraissi/PINNs/tree/master/main">https://github.com/maziarraissi/PINNs/tree/master/main</a>	精度+性能+310 推理	2021/8/15
11	AC	<p>PINNs: Physics-informed neural networks: A deep learning framework for solving forward and inverse problems involving nonlinear partial differential equations</p> <p>PPINN: Parareal Physics-Informed Neural Network for</p>	<a href="https://github.com/maziarraissi/PINNs/tree/master/main">https://github.com/maziarraissi/PINNs/tree/master/main</a>	精度+性能+310 推理	2021/8/15

		time-dependent PDEs			
12	Burgers	Fourier Neural Operator for Parametric Partial Differential Equations	<a href="https://github.com/zongyili/fourier_neural_operator">https://github.com/zongyili/fourier_neural_operator</a>	精度+性能+310 推理	2021/8/15
13	Navier-Stokes	Fourier Neural Operator for Parametric Partial Differential Equations	<a href="https://github.com/zongyili/fourier_neural_operator">https://github.com/zongyili/fourier_neural_operator</a>	精度+性能+310 推理	2021/8/15
14	Darcy Flow	Fourier Neural Operator for Parametric Partial Differential Equations	<a href="https://github.com/zongyili/fourier_neural_operator">https://github.com/zongyili/fourier_neural_operator</a>	精度+性能+310 推理	2021/8/15
15	HJBLQ	Deep learning-based numerical methods for high-dimensional parabolic partial differential equations and backward stochastic differential equations	<a href="https://github.com/frankhan91/DeepBSDE">https://github.com/frankhan91/DeepBSDE</a>	精度+性能+310 推理	2021/8/15
16	PricingDefaultRisk	Deep learning-based numerical methods for high-dimensional parabolic partial differential equations and backward stochastic differential equations	<a href="https://github.com/frankhan91/DeepBSDE">https://github.com/frankhan91/DeepBSDE</a>	精度+性能+310 推理	2021/8/15
17	AllenCahn	Deep learning-based numerical methods for high-dimensional parabolic partial differential equations and	<a href="https://github.com/frankhan91/DeepBSDE">https://github.com/frankhan91/DeepBSDE</a>	精度+性能+310 推理	2021/8/15

		backward stochastic differential equations			
--	--	---	--	--	--

## 5. 开发指导：

快速入门：[https://www.mindspore.cn/tutorial/training/zh-CN/r1.1/quick\\_start/quick\\_start.html](https://www.mindspore.cn/tutorial/training/zh-CN/r1.1/quick_start/quick_start.html)

网络迁移：[https://www.mindspore.cn/tutorial/training/zh-CN/r1.1/advanced\\_use/migrate\\_script.html](https://www.mindspore.cn/tutorial/training/zh-CN/r1.1/advanced_use/migrate_script.html)