CNN-DSMC-paddle-3D

1. 问题描述

数据集形状，输入为$(1, 2, 250, 250, 250)$，输出为$(1, 3, 250, 250, 250)$，共20组，精度为"float32"。

网络基于Unet，参数设置为

```
lr = 0.001
kernel_size = 5
filters = [8, 16, 32, 32, 64, 64, 128]
bn = True
wn = False
model = CNN_DSMC(2, 3, filters=filters, kernel_size=kernel_size, batch_norm=bn, weight_norm=wn)
wd = 0.005
optimizer = paddle.optimizer.AdamW(learning_rate=lr, parameters=model.parameters(), weight_decay=wd)
epochs = 10000
batch_size = 1
```

基于此参数进行训练，每个Epoch训练时间为

```
Epoch #2
    Train Loss = 28987287.125
    Validation Loss = 2966068.5625
运行1个epochs的时间为180.30 s
Model saved!
Epoch #3
```

显存及核心利用率情况为（batch_size设置为2则显存不够）：

```
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 511.09       Driver Version: 511.09       CUDA Version: 11.6     |
|-------------------------------+----------------------+----------------------+
| GPU  Name            TCC/WDDM | Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
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|   0  NVIDIA RTX A6000   WDDM  | 00000000:01:00.0  On |                  Off |
| 59%   83C    P2   219W / 300W |  36896MiB / 49140MiB |     100%      Default |
|                               |                      |                  N/A |
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| Processes:                                                                  |
|  GPU   GI   CI        PID   Type   Process name                  GPU Memory |
|        ID   ID                                                   Usage      |
|=============================================================================|
|    0   N/A  N/A      3736    C+G                                       N/A |
|    0   N/A  N/A      4320    C+G   ...y\ShellExperienceHost.exe       N/A |
|    0   N/A  N/A      5112    C+G   ...m Files\Typora\Typora.exe       N/A |
|    0   N/A  N/A      7368    C+G   ...nputApp\TextInputHost.exe       N/A |
|    0   N/A  N/A      8680    C+G   ...2\extracted\WeChatApp.exe       N/A |
|    0   N/A  N/A      9184    C+G   ...lPanel\SystemSettings.exe       N/A |
|    0   N/A  N/A     14396    C+G   ...me\Application\chrome.exe       N/A |
|    0   N/A  N/A     16644    C+G   C:\Windows\explorer.exe            N/A |
|    0   N/A  N/A     19688      C   ...Data\Anaconda3\python.exe       N/A |
|    0   N/A  N/A     19840    C+G   ...perience\NVIDIA Share.exe       N/A |
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|    0   N/A  N/A     28440    C+G   ...tracted\WechatBrowser.exe       N/A |
|    0   N/A  N/A     31884    C+G                                       N/A |
|    0   N/A  N/A     33532    C+G   ...5n1h2txyewy\SearchApp.exe       N/A |
+-----------------------------------------------------------------------------+
```

网络参数大小为171 MB。

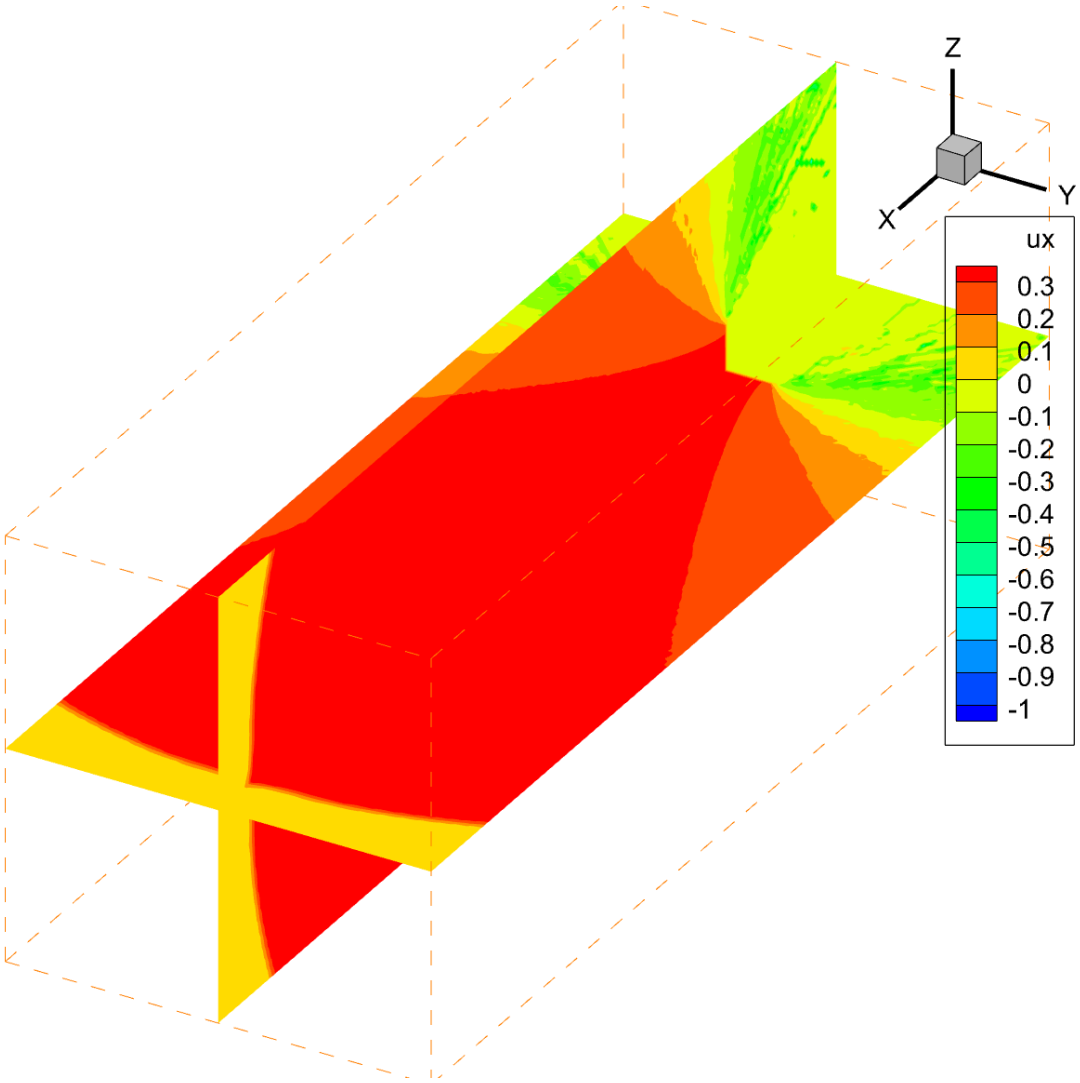
2. 目前进展

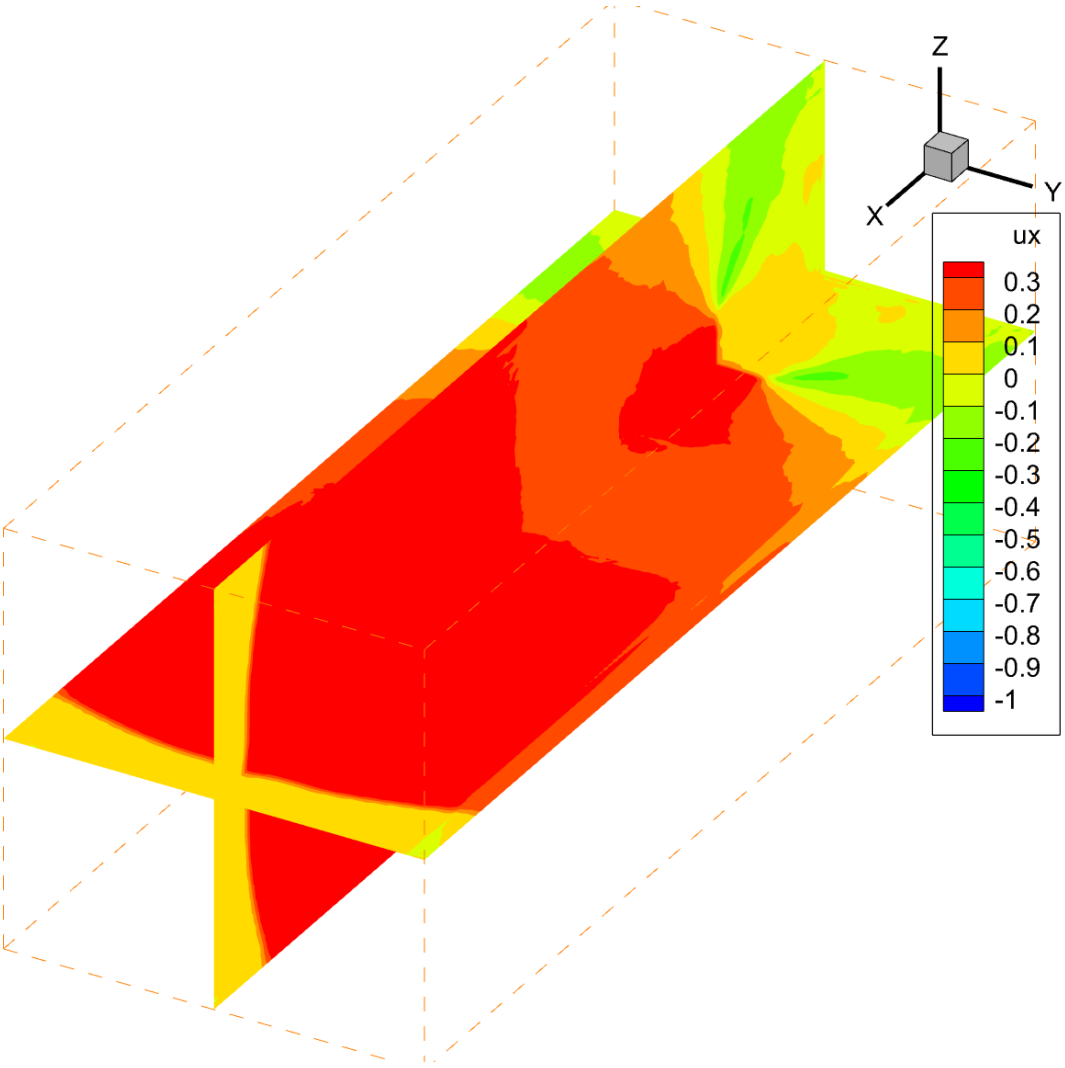
使用AMP训练模型，其它不变。

```
Epoch #2
    Train Loss = 34379900.125
    Validation Loss = 3537157.75
运行1个epochs的时间为183.03 s
Model saved!
Epoch #3
    Train Loss = 24520275.875
    Validation Loss = 3411042.6875
运行1个epochs的时间为179.45 s
```

使用AMP训练模型，同时将数据集形状减小，输入为$(1, 2, 250, 100, 100)$，输出为$(1, 3, 250, 100, 100)$。batch_size=2。

```
Epoch #2
    Train Loss = 10964831.8125
    Validation Loss = 5283448.5
运行1个epochs的时间为25.08 s
Model saved!
```

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