

# 低速后台阶算例计算步骤

## 1. 网格转换:

在总控文件 key.hypara 中设置任务类型为网格转换

```
int    nsimutask      = 1;
string parafilename   = "./bin/grid_para.hypara";
```

并在网格控制文件 grid\_para.hypara 中设置网格参数

```
int    gridtype = 1;
int    axisup   = 1;
int    from_gtype = 3;
string from_gfile = "./grid/2D_BackwardStep.grd";
string out_gfile = "./grid/2D_BackwardStep.fts";
```

双击运行 PHengLElv3d0.exe 即可得到转换后的网格文件

2D_BackwardStep.grd	2021/2/8 8:49	GRD 文件	7,542 KB
2D_BackwardStep.inp	2021/2/8 8:49	INP 文件	2 KB
2D_BackwardStep_0.bcmesh	2021/3/25 16:02	BCMESH 文件	12,637 KB
2D_BackwardStep_0.bcname	2021/3/25 16:02	BCNAME 文件	1 KB
2D_BackwardStep_0.fts	2021/3/25 16:02	FTS 文件	7,603 KB
2D_BackwardStep_0.link	2021/3/25 16:02	LINK 文件	1 KB

## 2. 边界条件:

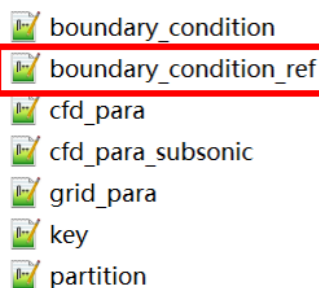
网格生成完毕, 包含网格边界条件信息的 boundary\_condition.hypara 文件也随之生成

```
int nBoundaryConditons = 4;
string bcName = "SOLID_SURFACE";
{
    int bcType = 2;
}
string bcName = "SYMMETRY";
{
    int bcType = 3;
}
string bcName = "FARFIELD";
{
    int bcType = 4;
}
string bcName = "OUTFLOW";
{
    int bcType = 6;
}
```

在新生成的 boundary\_condition.hypara 文件中修改出口边界为压力出口类型 62，并设置相关参数

```
string bcName = "OUTFLOW";
{
    int bcType = 62;
    double staticPressure = 101783.4;
}
```

(bin 文件夹中的 boundary\_condition\_ref.hypara 文件为已经设置好的参考边界条件参数，用户可参照该文件对新生成的 boundary\_condition.hypara 文件进行修改)



### 3. 网格分区:

在总控文件 key.hypara 中修改参数，设置任务类型为网格分区

```
int    nsimutask    = 3;
string parafilename = "./bin/partition.hypara";
```

并在网格分区文件 partition.hypara 中设置网格参数

```
int    pgridtype = 1;
int    maxproc   = 4;
string original_grid_file = "./grid/2D_BackwardStep.fts";
string partition_grid_file = "./grid/2D_BackwardStep__4.fts";
int    numberOfMultigrid = 1;
```

双击运行 PHengLElv3d0.exe 即可得到分区后的网格文件。

2D_BackwardStep__4_0.fts	2021/3/25 16:37	FTS 文件	7,704 KB
2D_BackwardStep__4_0.link	2021/3/25 16:37	LINK 文件	2 KB

### 4. 运行算例:

在总控文件 key.hypara 中修改参数，设置任务类型为数值计算

```
int ndim          = 2;
int nparafilename = 1;
int nsimutask     = 0;
string parafilename = "./bin/cfd_para_subsonic.hypara";
```

修改对应解算器 cfd\_para\_subsonic 文件中的主要计算参数

```
int maxSimuStep      = 200000;

int intervalStepFlow = 1000;
int intervalStepPlot = 1000;
int intervalStepForce = 100;
int intervalStepRes   = 50;
int ifLowSpeedPrecon = 0;

double refMachNumber = 0.128;
double attackd       = 0;
double angleSlide    = 0.00;

int inflowParaType = 0;
double refReNumber = 2834645.7;
double refDimensionalTemperature = 298.33;

double gridScaleFactor = 0.0127;

double forceRefenenceLengthSpanWise = 1.0;
double forceRefenenceLength = 1.0;
double forceRefenenceArea = 1.0;
double TorqueRefX = 0.0;
double TorqueRefY = 0.0;
double TorqueRefZ = 0.0;

int viscousType = 3;
string viscousName = "leq-sa";
```

cmd 进入工程目录，输入命令：mpirun -n 4 ./PHengLElv3d0.exe 并行执

行程序