

modeFRONTIER初级培训教程

实例3: EasyDriver节点流程集成

IDAJ-China 技术部
2019 年 5 月

- 所有公司名，产品名，服务名是各个公司的商标或登记商标以及服务商标。
- 本资料包括保密信息。没有得到敝公司的同意，请不要使用，发布，复制本资料或本电子档。

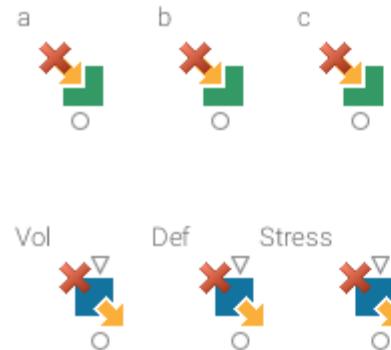


问题描述

- modeFRONTIER中已经包含直接集成的节点模块，而通过EasyDriver节点可以集成任意软件或应用。
- 需要定义输入脚本文件和输出脚本文件。
- 需要对该需集成的软件的语言有一定了解。

变量定义

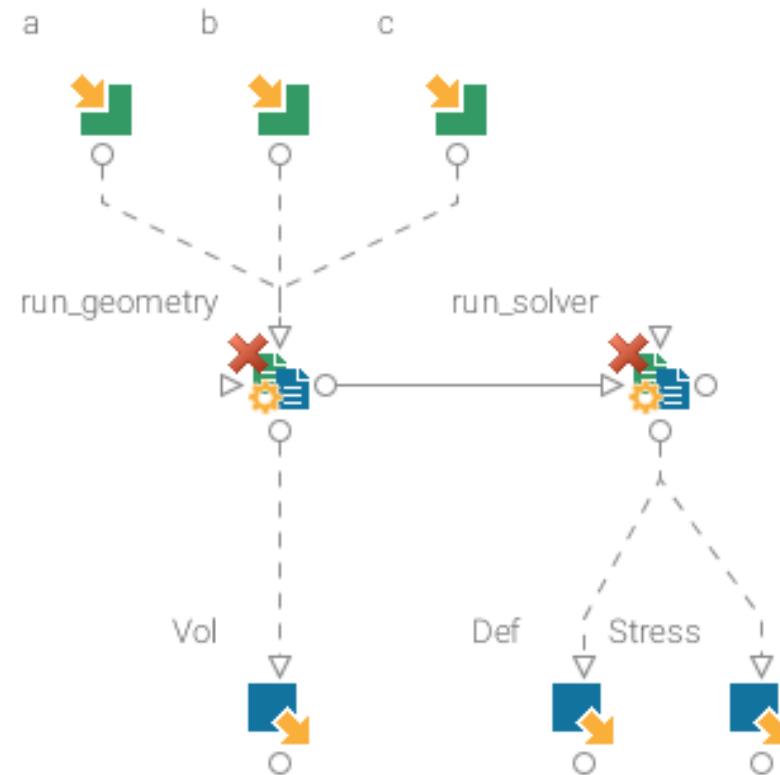
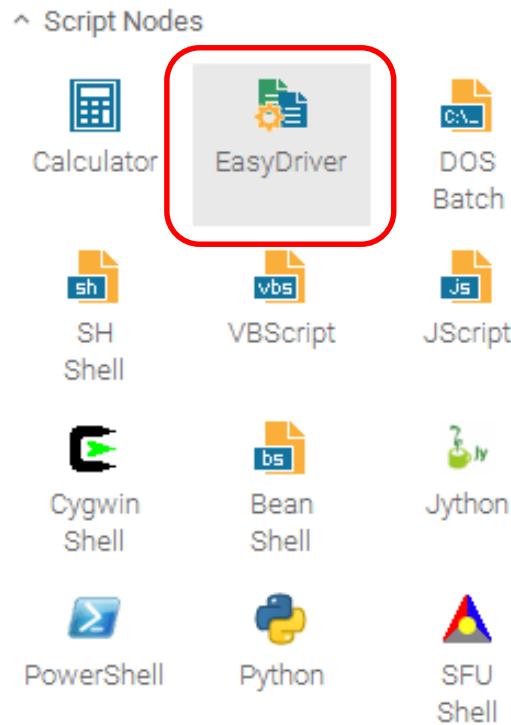
- 新建项目文件，定义输入变量数据
- 变量 $a = [1,10]\text{mm}$
- 变量 $b = [50,150]\text{mm}$
- 变量 $c = [50,250] \text{ mm}$
- 定义输出变量Vol、Def、Stress



	Input Variable	Output Variable	Design Objective	Design Constraint		
	Name	Type	Default Value	Expression	Lower Bound	Upper Bound
1	a	Variable	0.0		1.0	10.0
2	b	Variable	0.0		50.0	150.0
3	c	Variable	0.0		50.0	250.0

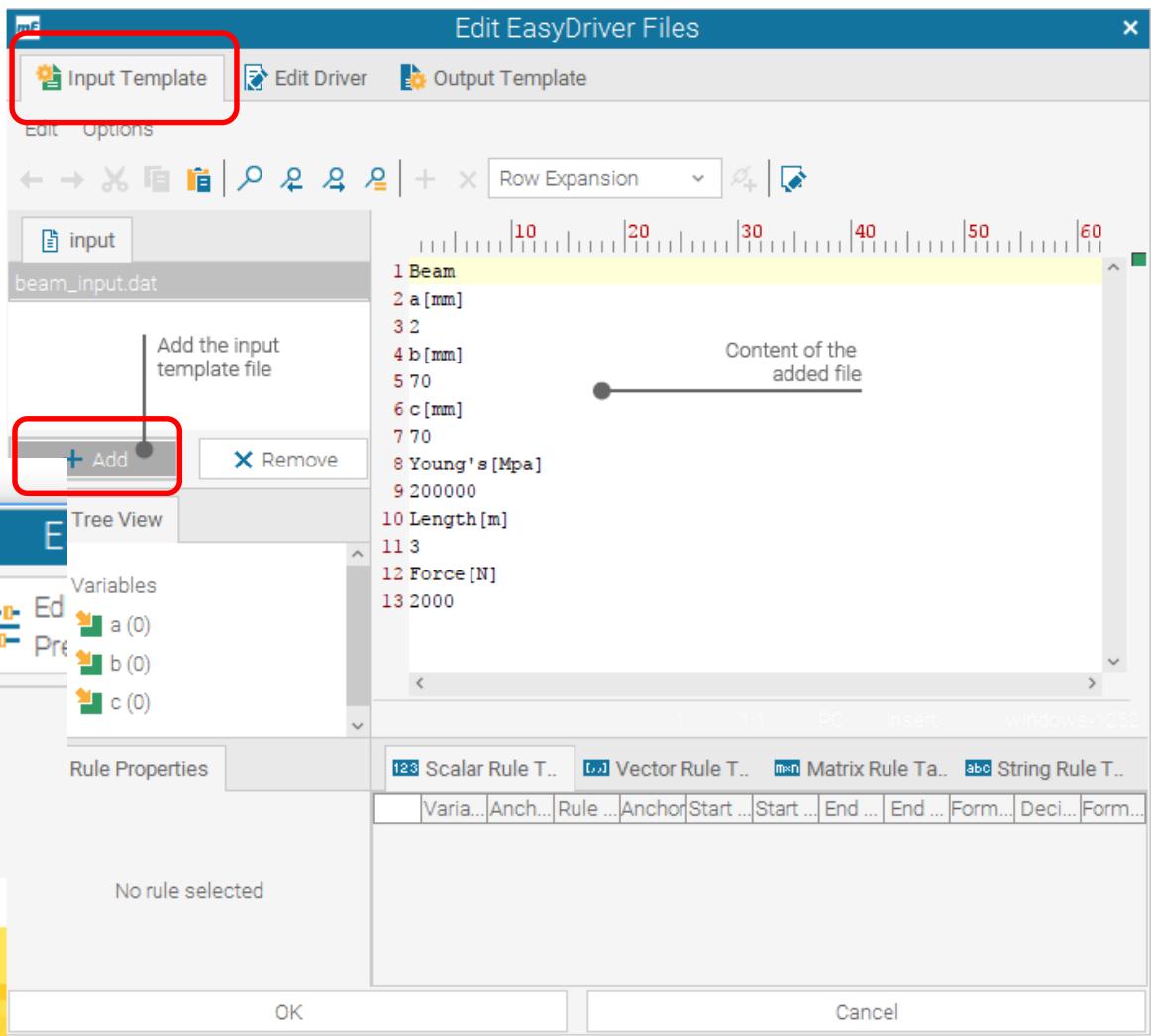
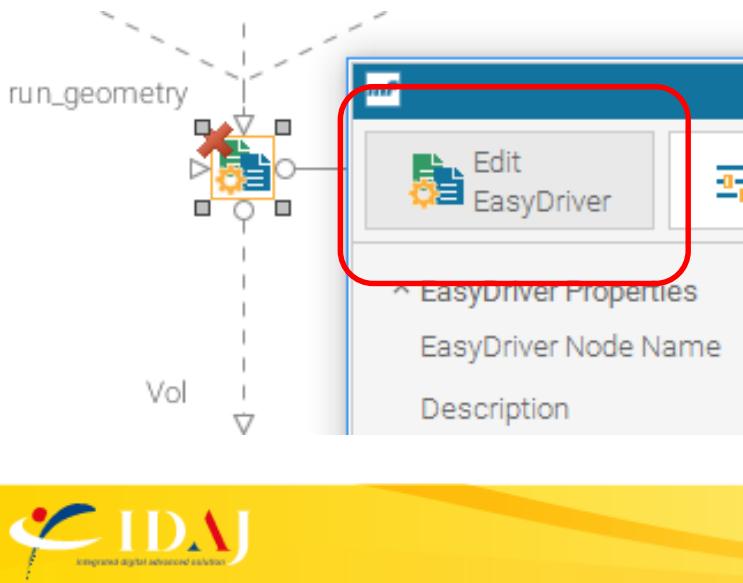
插入EasyDriver节点

- 在空白处插入两个EasyDriver节点，重命名为`run_geometry`和`run_solver`，并连接至输入和输出节点



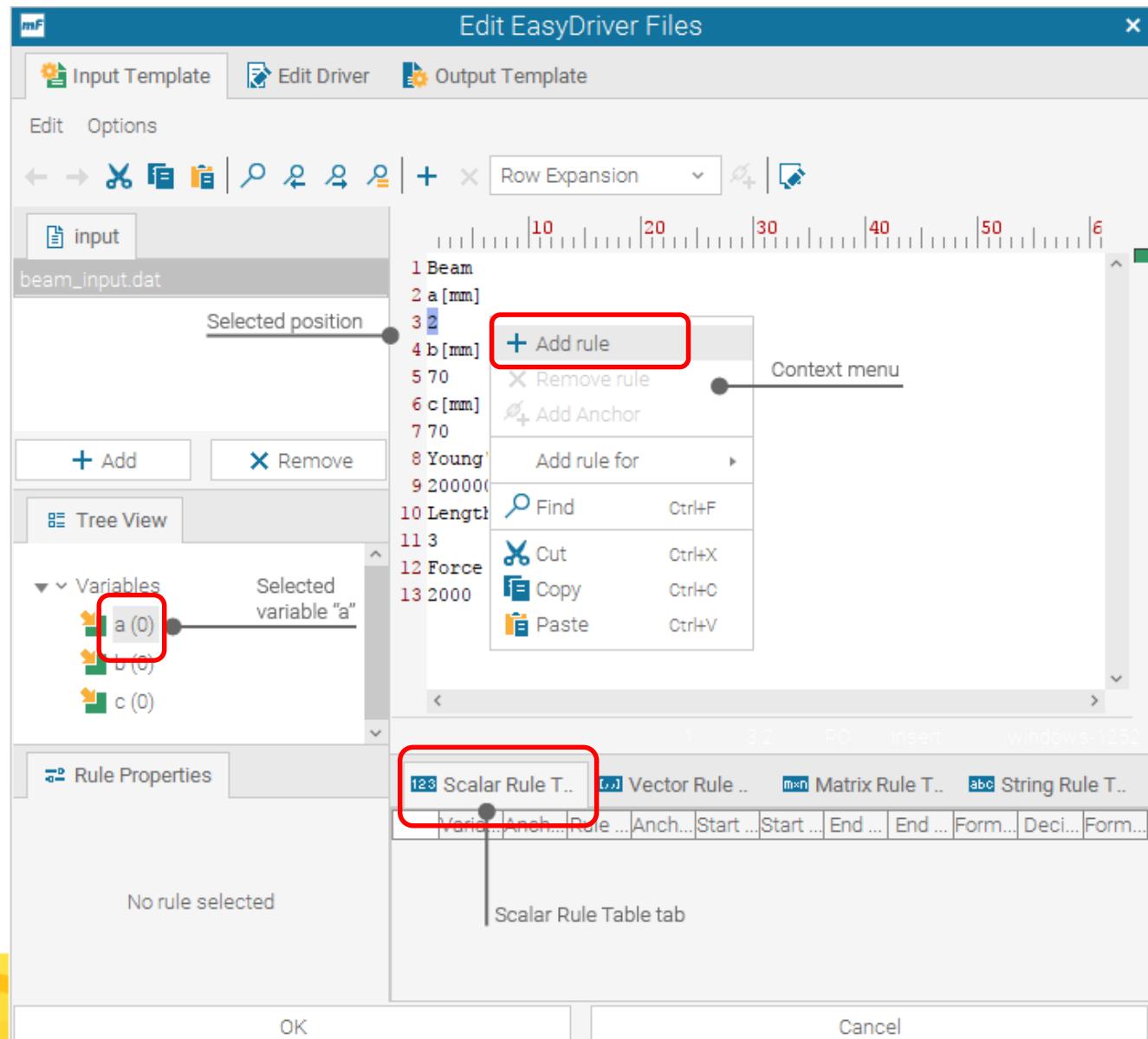
第一个EasyDriver节点配置

- 双击run_geometry节点，点击Edit EasyDriver图标，进入编辑界面
1. 点击Input Template 标签
 2. 在Input Template Files 栏目点击Add键，并导入beam_input.dat文件
 3. 观察显示的文本内容



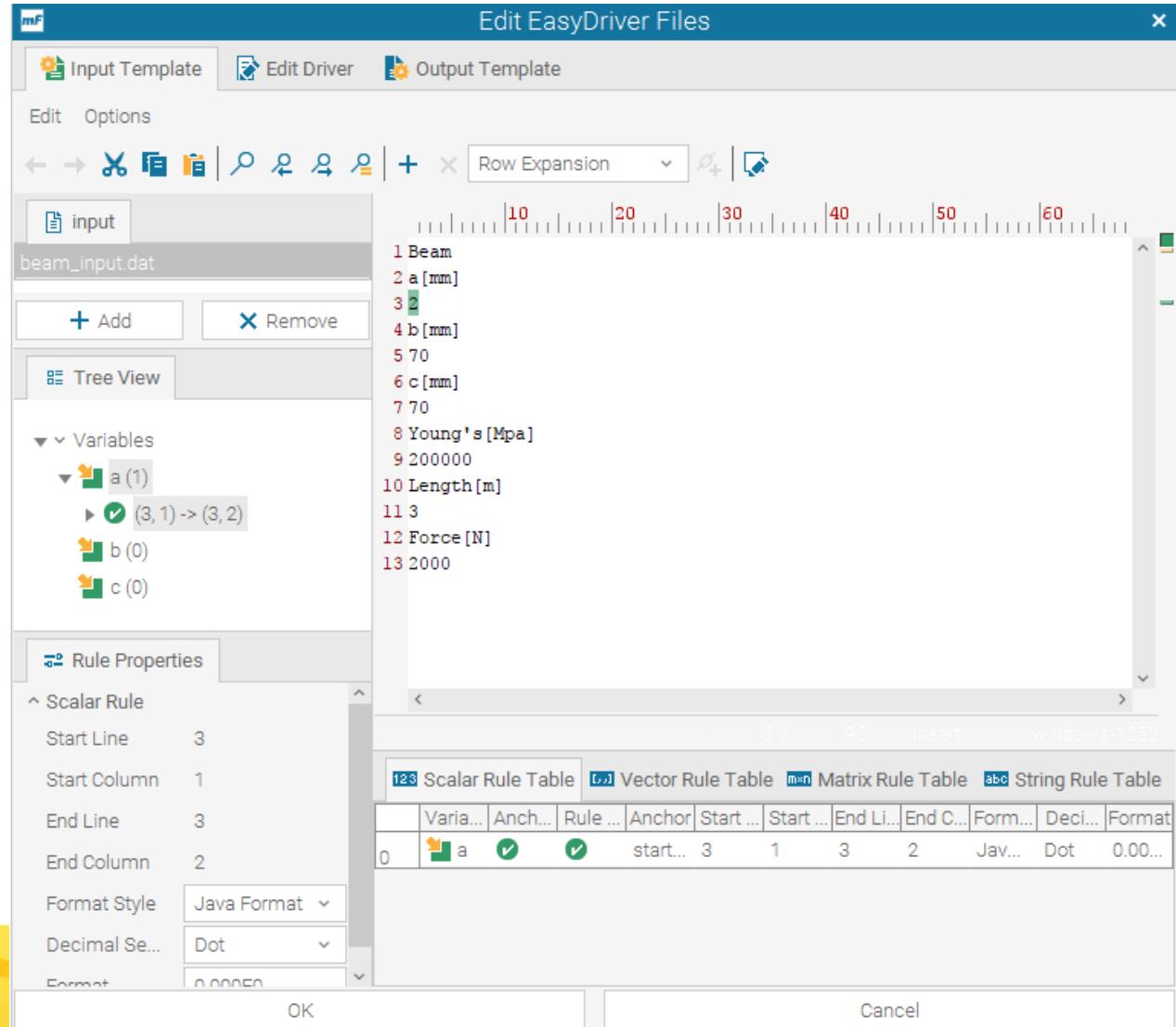
第一个EasyDriver节点配置

1. 点击左下方Scalar Rule Table图标
2. 在Tree view栏目里选择参数a
3. 选择文本框中第三行的数字2，点击右键选择Add rule



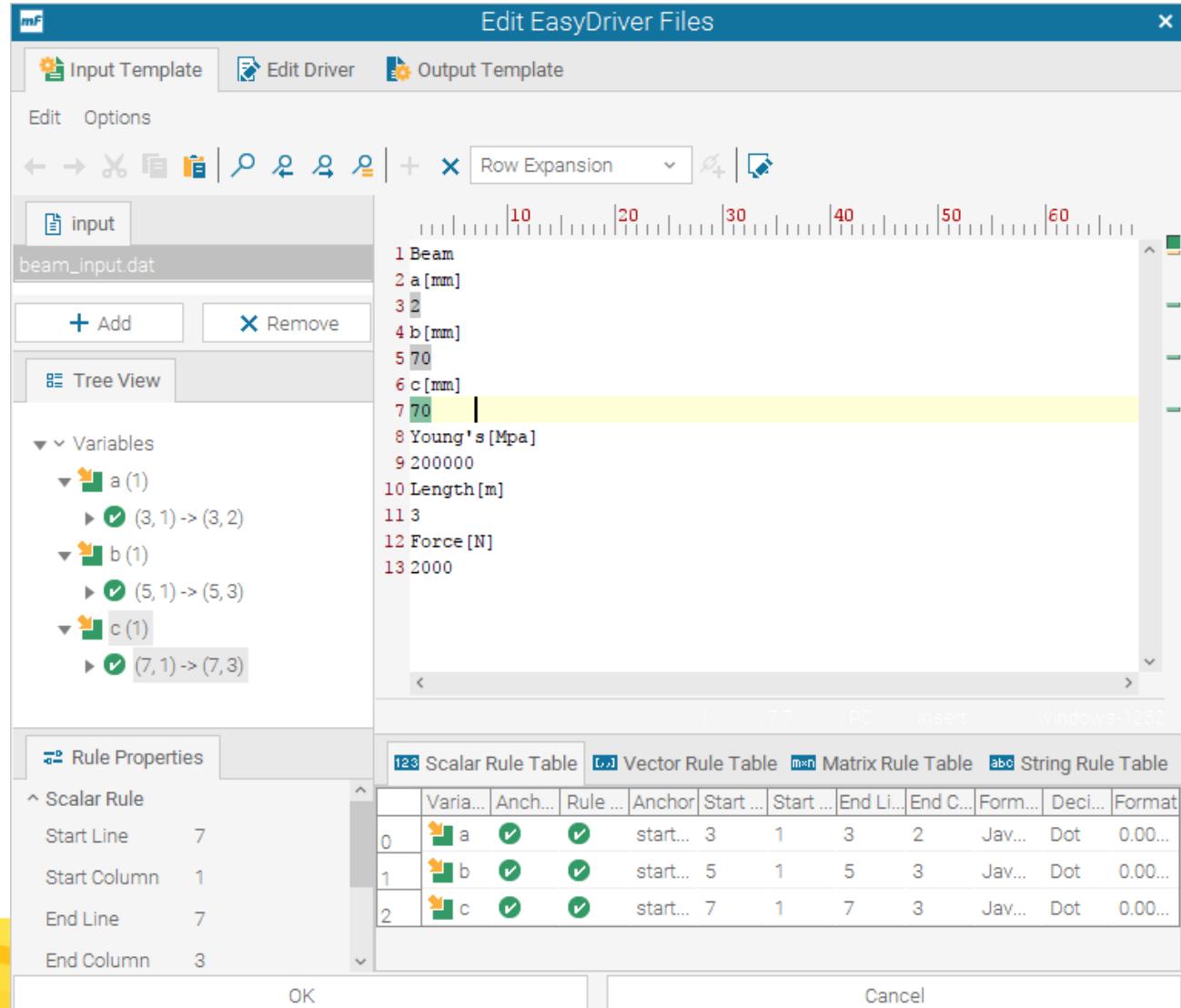
第一个EasyDriver节点配置

- 为参数a配置完成后，可以在Scalar Rule Table及Tree View下看到增加的内容



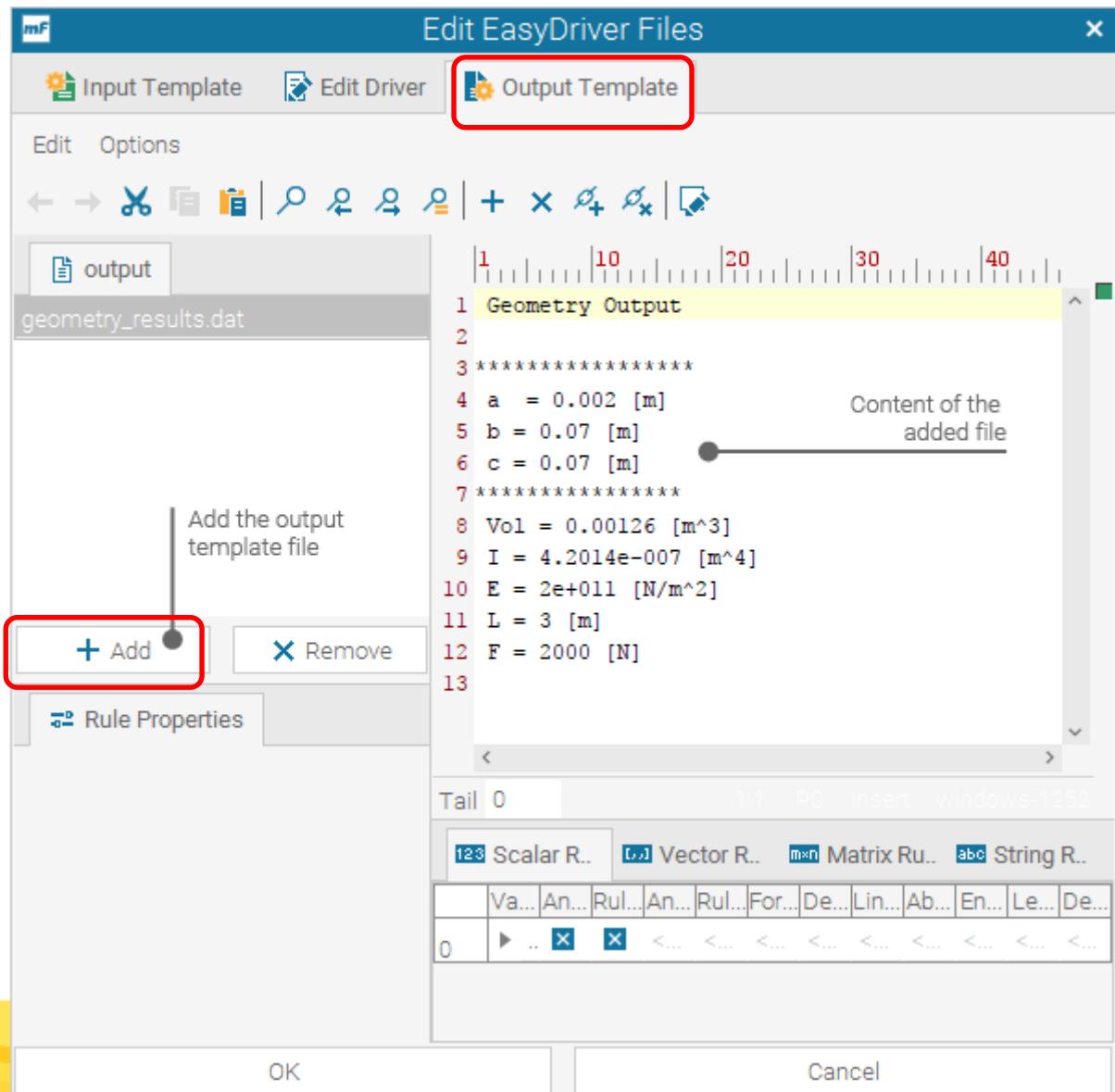
第一个EasyDriver节点配置

- 定义好的参数如左下图所示，重复该操作为参数 b 和 c 定义规则



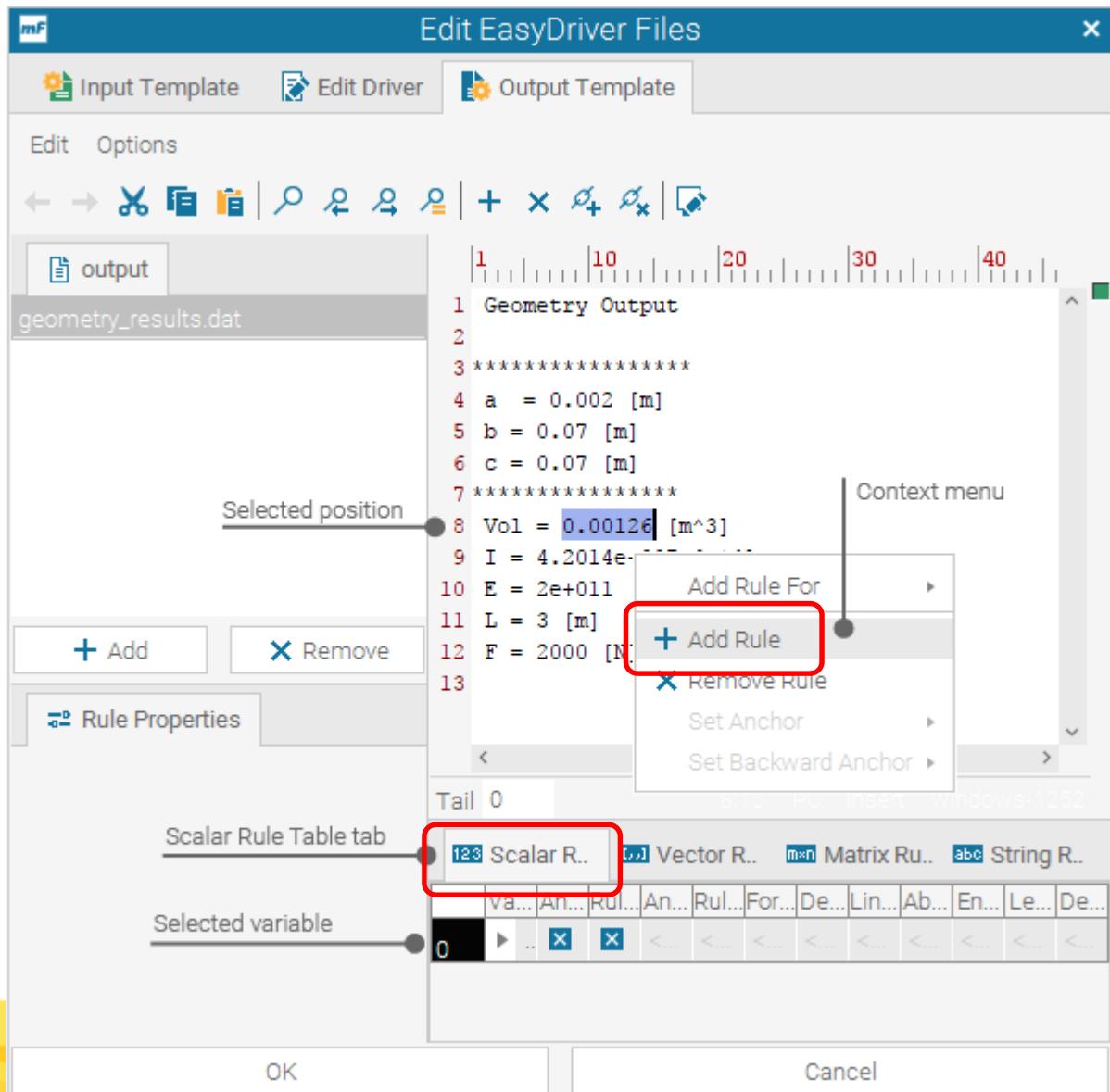
第一个EasyDriver节点配置

1. 点击Output Template 标签，定义输出参数规则
2. 在Output Template File栏目点击Add图标，并导入 geometry_results.dat
3. 在右侧文本框会显示输出文件脚本的内容



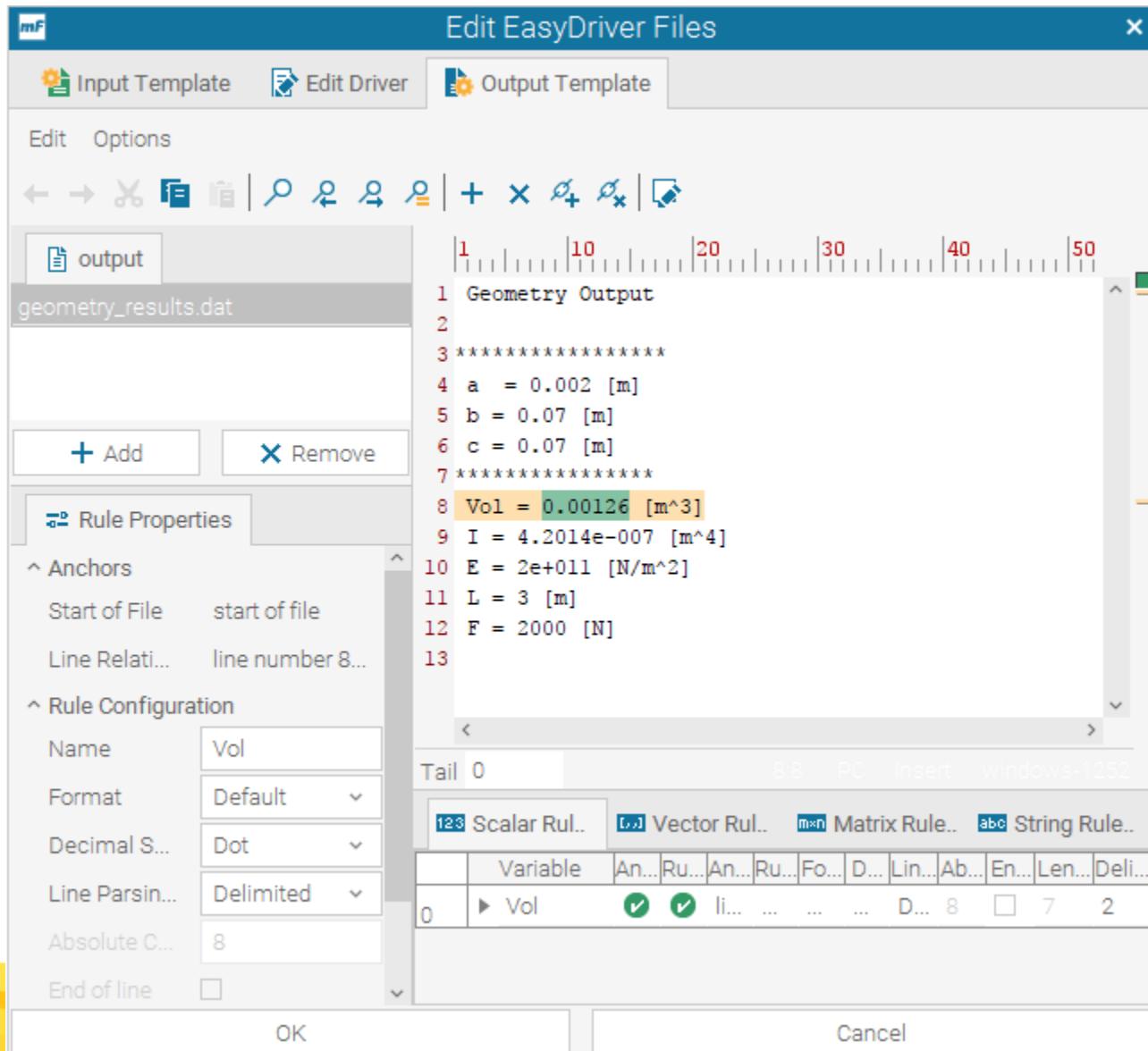
第一个EasyDriver节点配置

1. 点击左下方Scalar Rule Table图标
2. 选择输出参数Vol
3. 选择文本框中第八行的数字0.00126，点击右键选择Add rule



第一个EasyDriver节点配置

- 定义好的参数可以在Scalar Rule Table下查看提取的数值位置
- 这种方法为通过寻找绝对位置来为参数赋值



第一个EasyDriver节点配置

- 也可为数值定义相对参考位置，选择Vol点击右键选择Set Anchor，将Vol字符定义为相对参考值

The screenshot shows the EasyDriver interface with the following details:

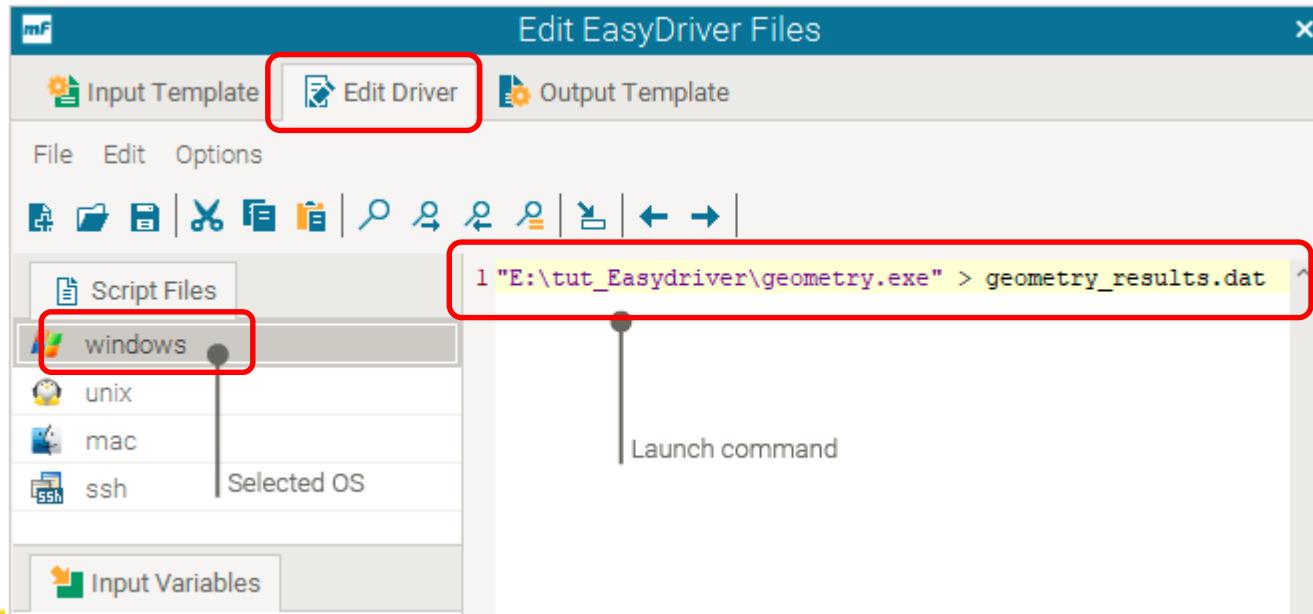
- Code View:** Shows line numbers 8, 9, 10, 11, 12, and 13. Line 8 contains the assignment `Vol = 0.00126 [m^3]`.
- Context Menu:** A context menu is open over the word "Vol". The menu items are:
 - Add Rule For
 - + Add Rule
 - Remove Rule
 - Set Anchor** (highlighted with a red box)
 - Set Backward Anchor
- Scalar Rule Table:** A table showing rule definitions. The columns are Variable, Anchor..., Rule ..., and Anchor.
- Data in Scalar Rule Table:**

	Variable	Anchor...	Rule ...	Anchor
0	▶ Vol	✓	✓	line number 1 from occurrence 1 of token "Vol" start of file

第一个EasyDriver节点配置

1. 选择Edit Driver图标
2. 在script Files选择Windows操作系统
3. 在文本框中输入 "*C:\EasyDriver_Node\windows\geometry.exe" > geometry_results.dat*"

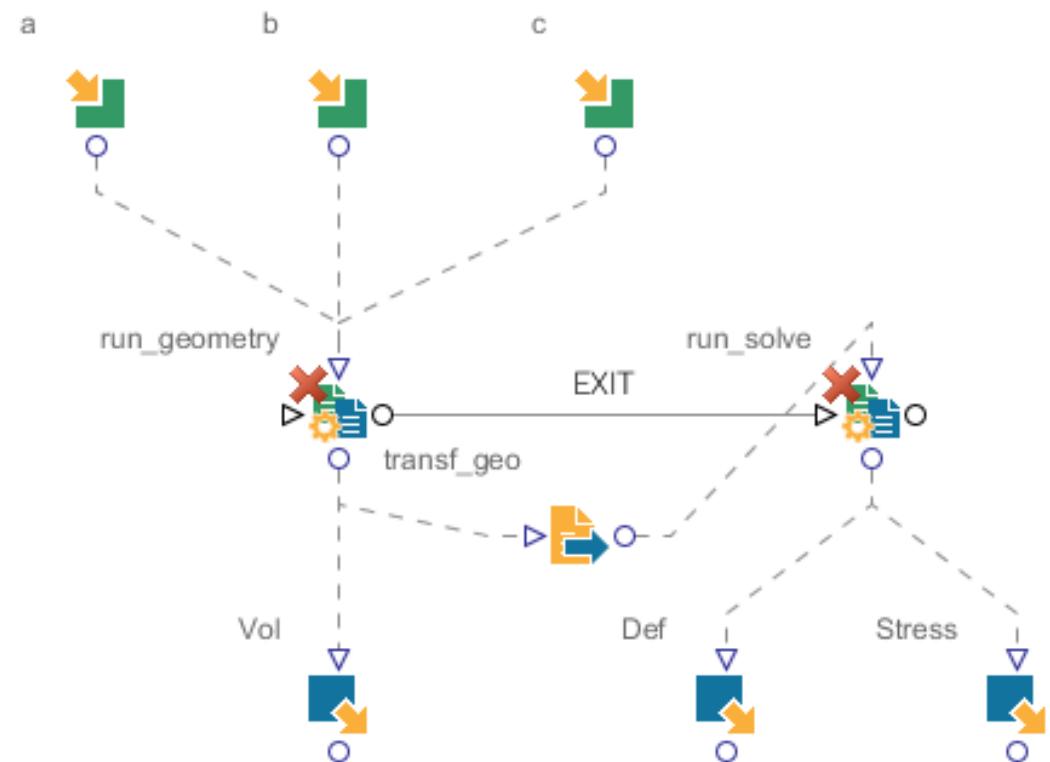
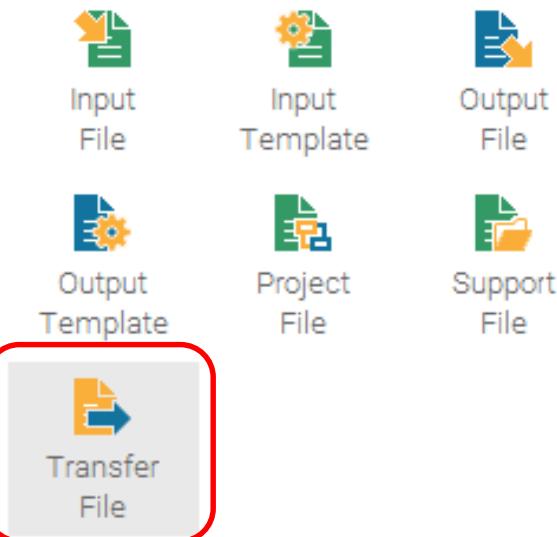
*注意命令中的路径应修改为当前文件夹位置



插入文件传输节点

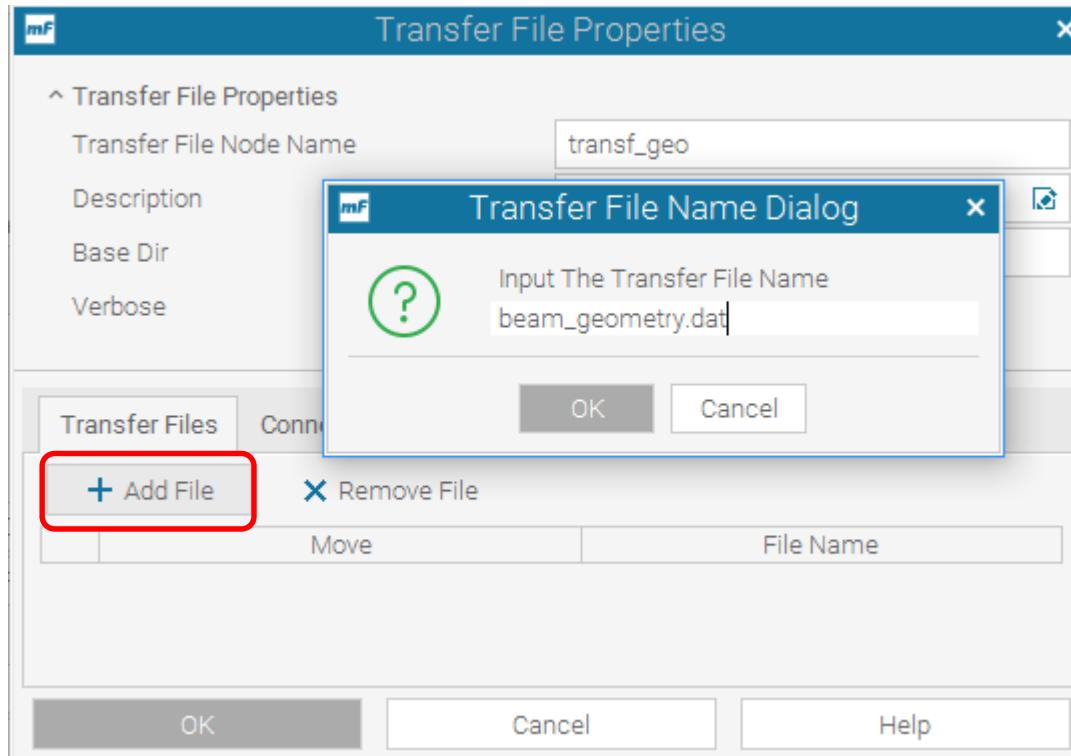
- 插入Transfer File节点，与两个EasyDriver节点连接。

File Nodes



文件传输节点配置

1. 双击Transfer File节点，点击Add File图标。
2. 在弹出的对话框输入beam_geometry.dat,该文件将创建在run_geometry节点对应的文件夹，并拷贝到run_solver节点对应的文件夹。



第二个EasyDriver节点配置

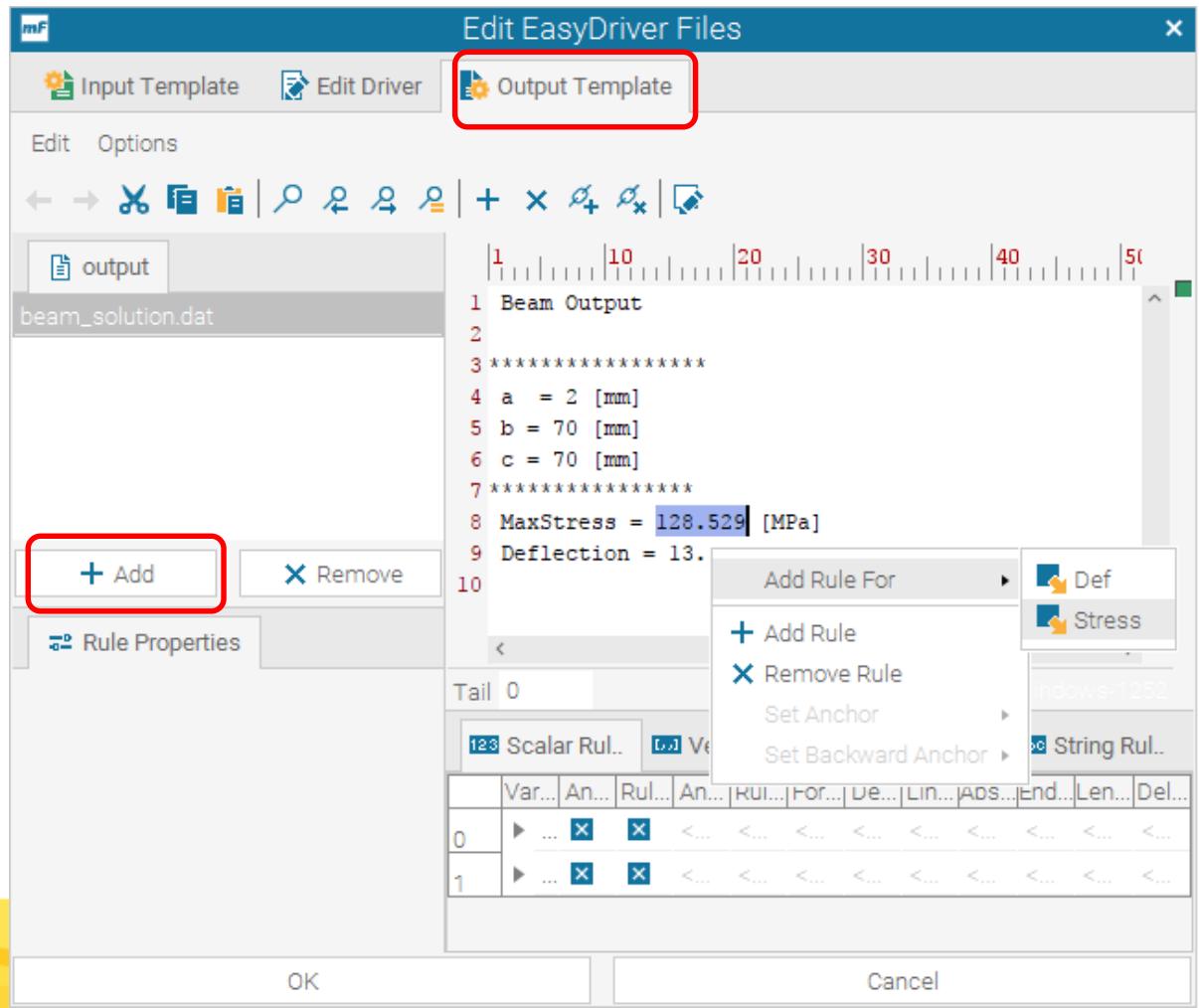
- 双击run_solver节点，点击Edit EasyDriver图标，进入编辑界面

1. 点击Output Template

标签

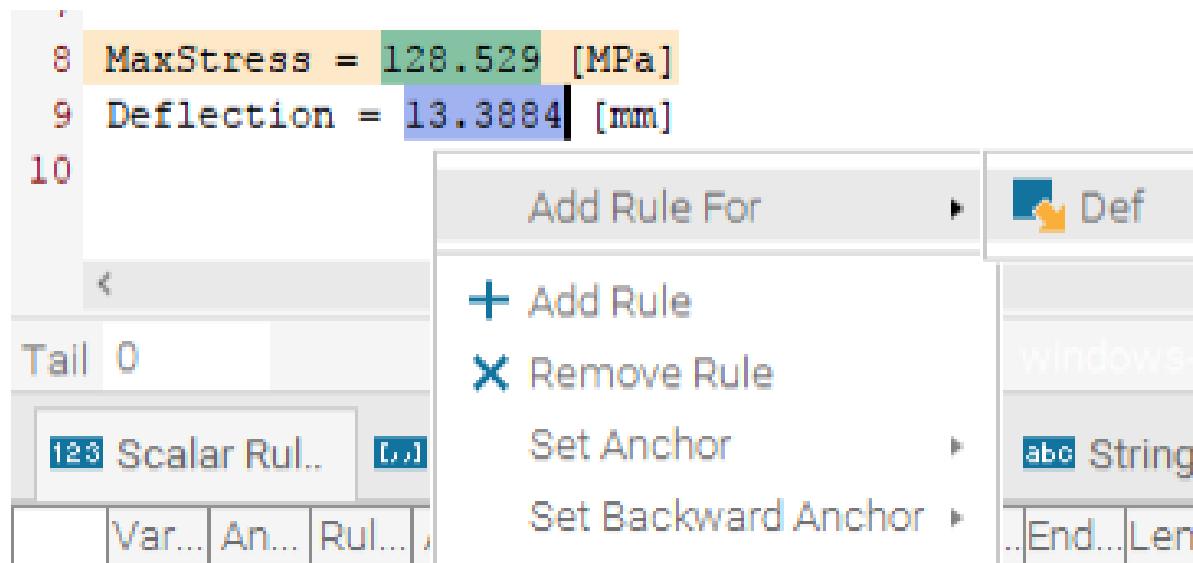
2. 在Output Template Files栏目点击Add键，并导入beam_solution.dat文件

3. 文本内容在文本框显示



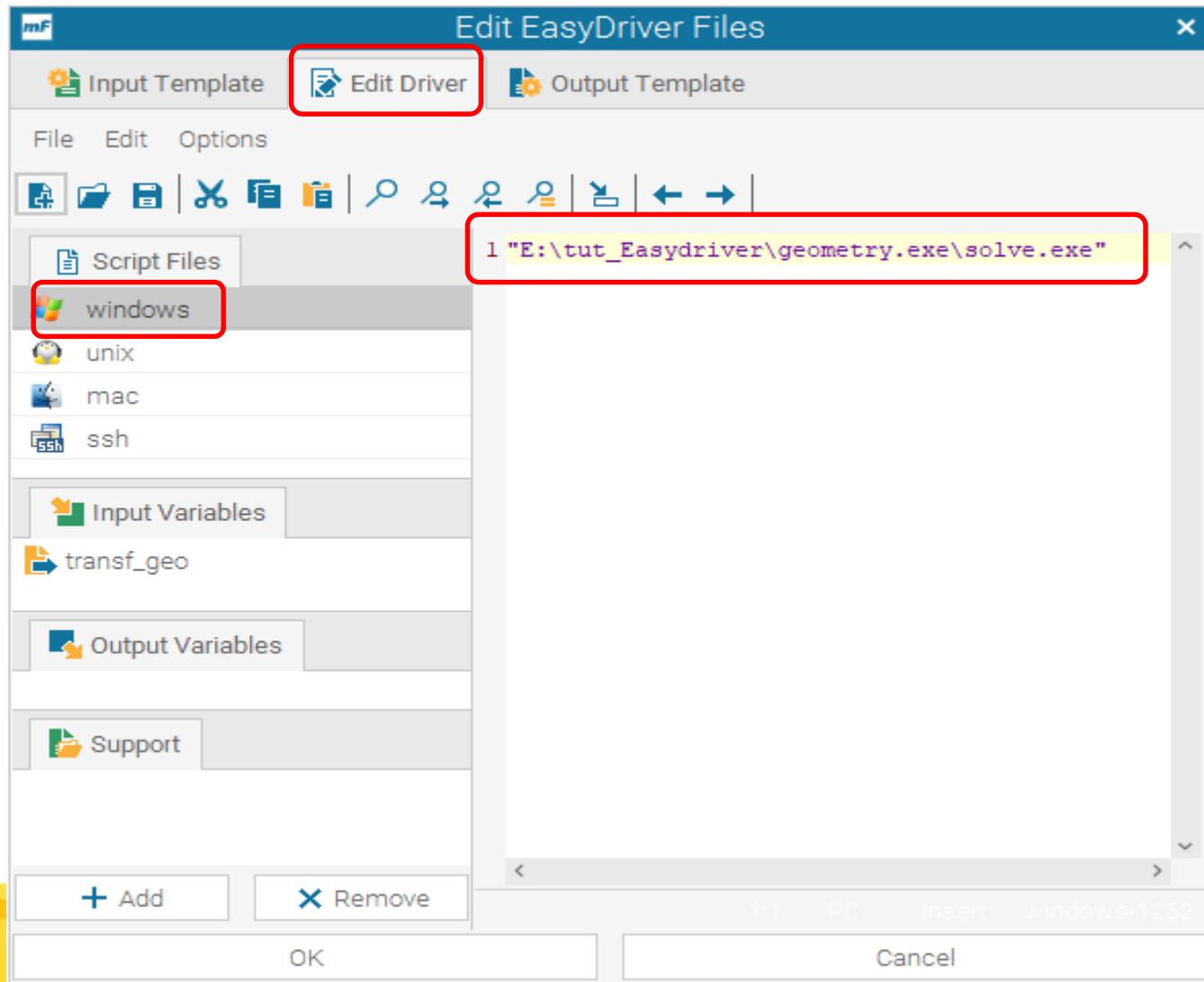
第二个EasyDriver节点配置

- 参照之前的方法，将第八行数值定义为**Stress**，将第九行数值定义为**Def**



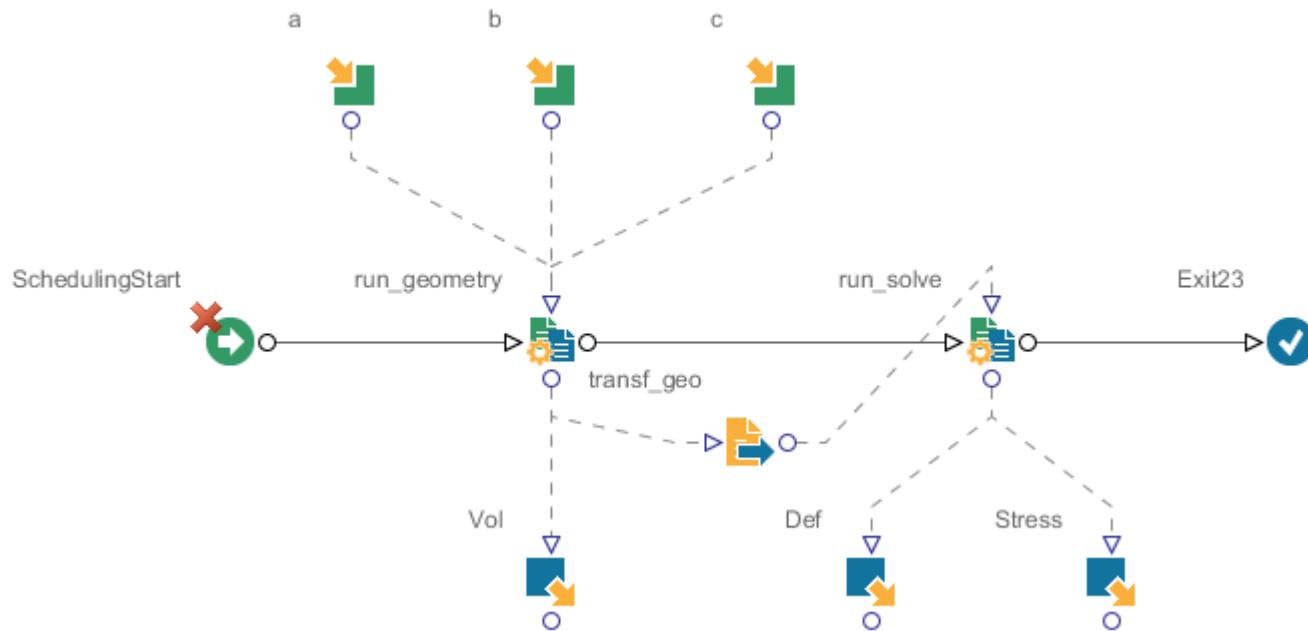
第二个EasyDriver节点配置

- 点击Edit Driver标签，选择到Windows，输入solve.exe的路径来执行该文件



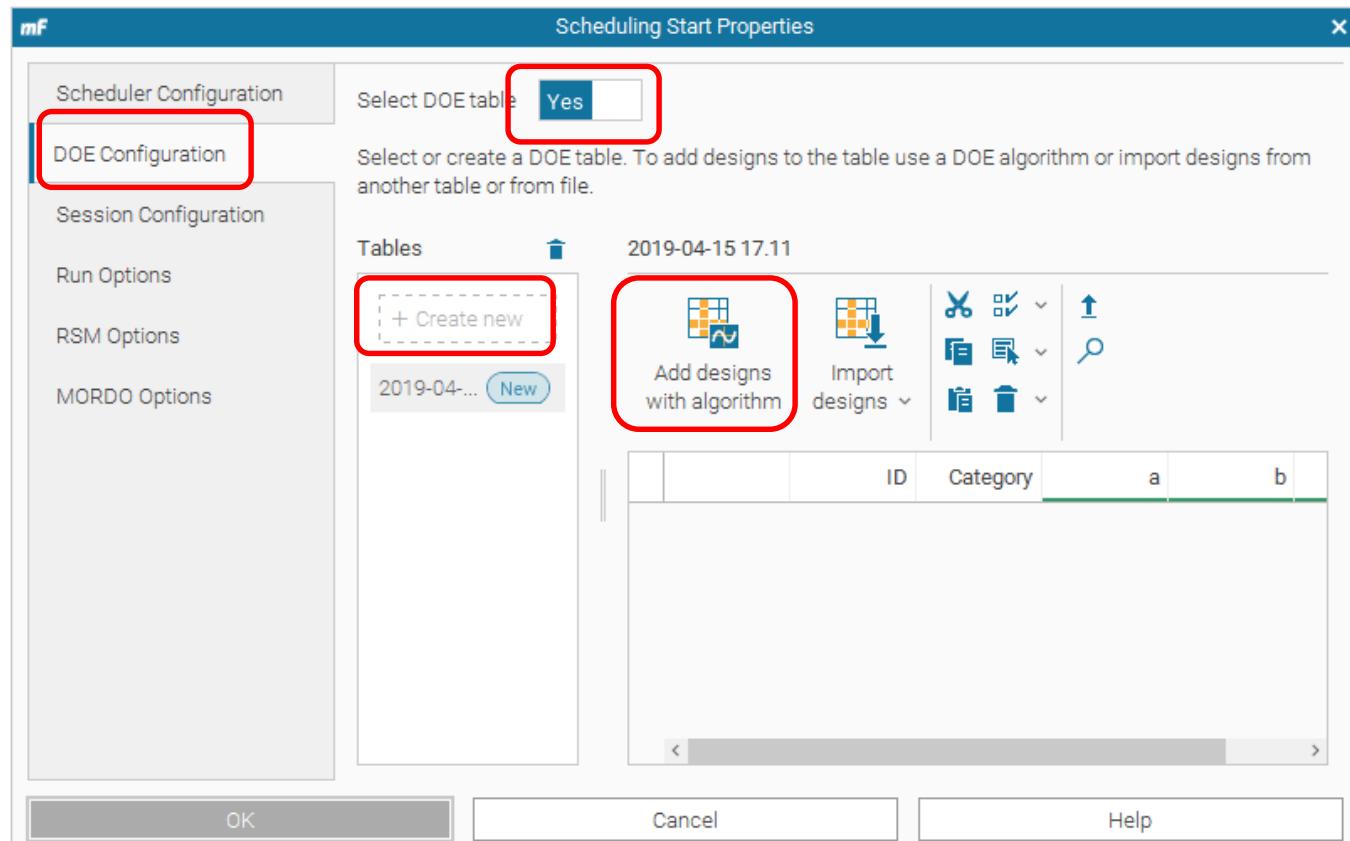
工作流程设置

- 插入*Scheduling Start*节点及*Logic End*节点并连接，将任务流程设置完成



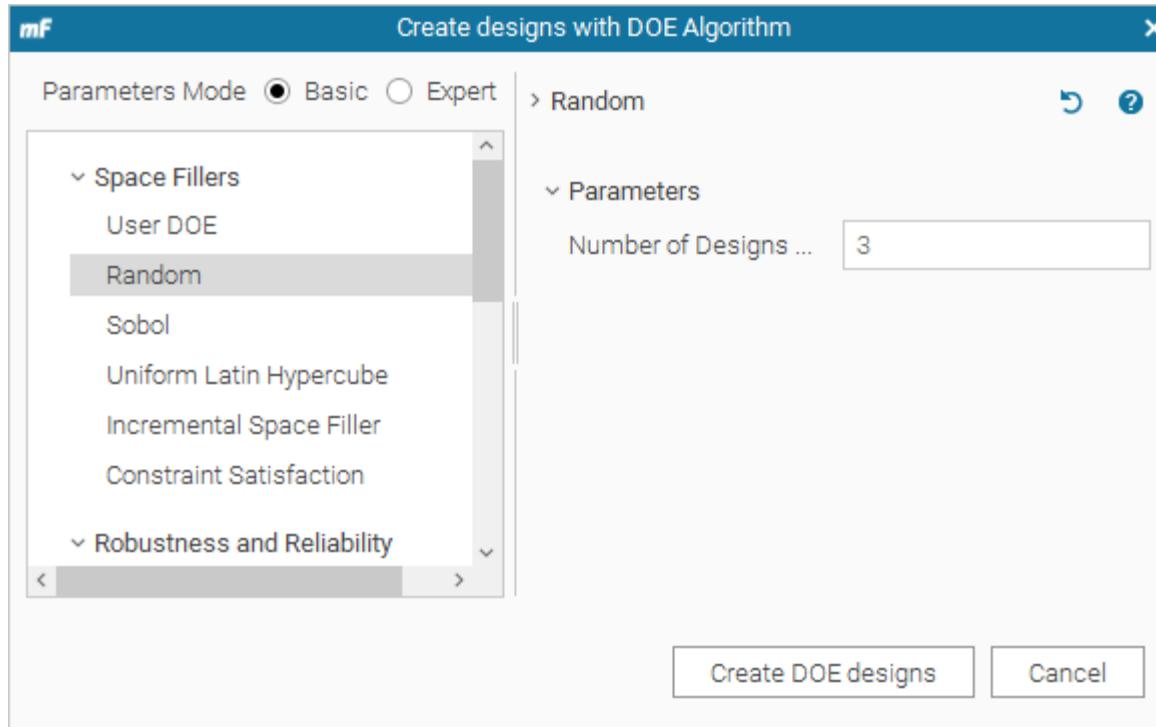
DOE算法设置

1. 双击进入 Scheduling Start 节点
2. 切换至DOE configuration
3. 切换select DOE table为yes
4. 在Tables下点击 Create new
5. 点击add designs with algorithm



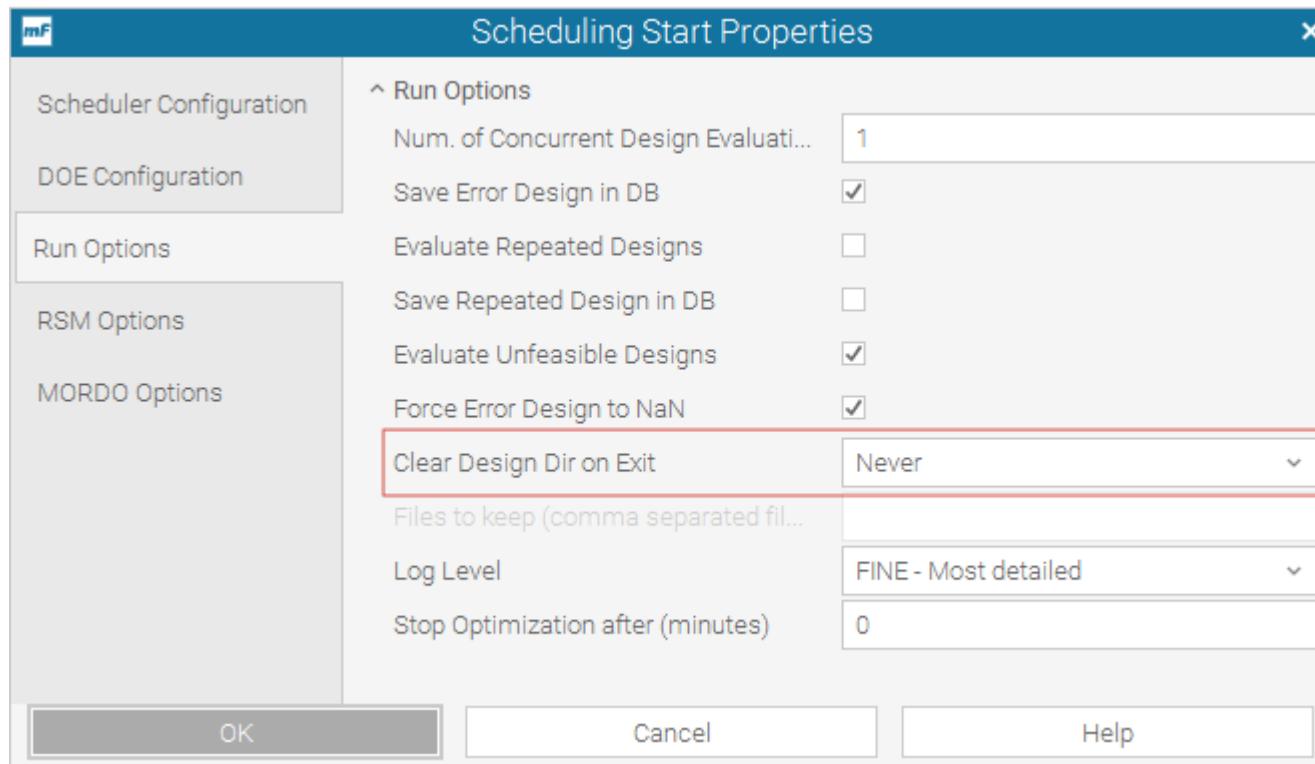
工作流程设置

■ 选择Random算法，设置计算数目为3



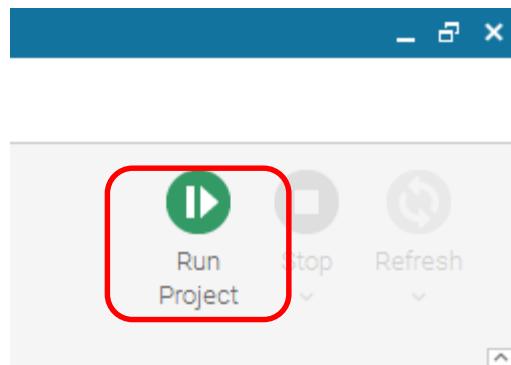
工作流程设置

- 在Run Options栏目下选择Clear Design Dir on Exit为Never，求解完成后将保留完整的计算相关的文件。



运行测试

- 点击运行按钮开始计算，在Project Info窗口中选择0000-9999，打开文件路径，所列数字代表对应计算的文件夹，可以查看计算的记录



Event	Argument
DESIGNS GROUP STARTED	00000-00999 (Groups Index)
DESIGN STARTED	00000
DESIGN COMPLETED	00000 ELAPSED TIME = 0h:0m:7.448s
DESIGN STARTED	00001
DESIGN COMPLETED	00001 ELAPSED TIME = 0h:0m:3.609s
DESIGN STARTED	00002
DESIGN COMPLETED	00002 ELAPSED TIME = 0h:0m:3.602s
DESIGNS GROUP COMPLETED	00000-00999 (Groups Index , COMPLETED=3)

```
00000 (00000-00999, Design Data)
run_geometry, job_out, job_err, jvm_out, jvm_err, Input Data, Dir
run_geometry: Process requested
run_geometry: Process obtained
run_geometry: Running locally
run_geometry: Job process disposed
run_geometry, job_out, job_err, jvm_out, jvm_err, Input Data, Output Data, Dir, Ex
TransFile9, job_out, job_err, Dir
TransFile9, job_out, job_err, Dir, Exit Port: EXIT ELAPSED TIME = 0h:0m:0.058s
run_solver, job_out, job_err, jvm_out, jvm_err, Dir
run_solver: Process requested
run_solver: Process obtained
run_solver: Running locally
run_solver: Job process disposed
run_solver, job_out, job_err, jvm_out, jvm_err, Output Data, Dir, Exit Port: EXIT
00000 (00000-00999, Design Data) ELAPSED TIME = 0h:0m:7.446s
```

运行计算

- 点击run_geometry提示行的Dir链接，可以看到该模块计算所需的全部文件均保存在对应路径下。
- 保证求解中无错误提示

run_geometry, job_out, job_err, jvm_out, jvm_err, Input Data, [Dir](#)

2016\EasyDriver_Node\ed_run_00000\proc\00000-00999\00000\run_geometry_00000

Name	Size	File Type	Last Modified
Up to a higher level directory			
beam_geometry.dat	184 B	DAT File	Tue Jan 26 11:09:48
beam_input.dat	111 B	DAT File	Tue Jan 26 11:09:48
geometry_results.dat	211 B	DAT File	Tue Jan 26 11:09:48

约束及目标节点添加

- 在工作流程中添加设计目标及设计约束。
- 设计目标命名为min_weight及min_def, 分别对应输出节点的weight及def, 目标为两个输出变量最小化
- 设计约束命名为const_stress, 设定小于100

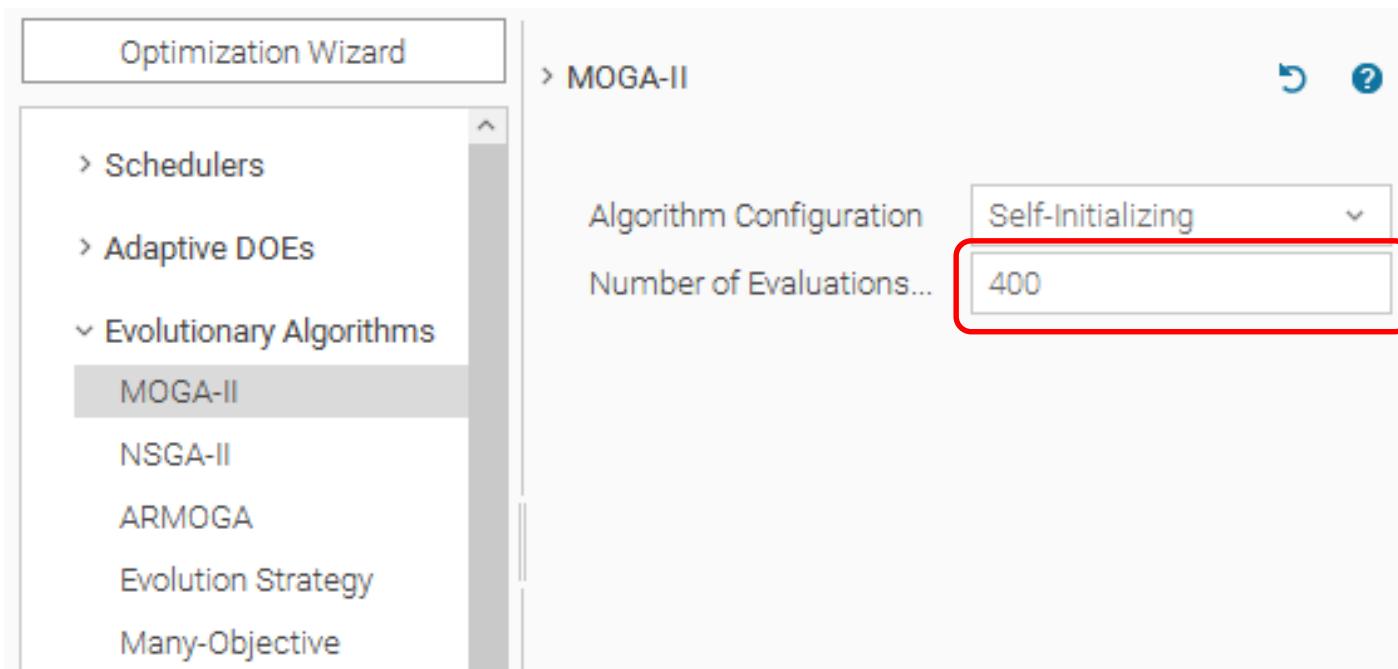
	Enabled	Name	User Expression	Type	Format
1	<input checked="" type="checkbox"/>	min_weight	Vol*8000	Minimize	0.0000E0

	Enabled	Name	User Expression	Type	Format
1	<input checked="" type="checkbox"/>	min_def	Def	Minimize	0.0000E0

	Enabled	Name	User Expression	Type	Limit	Tolerance	Format
1	<input checked="" type="checkbox"/>	const_stress	Stress	Less Than	100.0	0.0	0.0000E0
2	<input checked="" type="checkbox"/>	const_weight	Vol*8000	Less Than	20.0	0.0	0.0000E0

设定优化条件并计算

- 打开Scheduling Start 节点，选择scheduler configuration选项
- 选择优化算法为**MOGA-II**，设置计算设计点数为**400**
- 重新提交计算，并查看结果





艾迪捷信息科技有限公司

中国. 北京. 朝阳区光华路甲14号1幢诺安基金大厦1601室
Email: support@idaj.cn
Tel: 86-010-65881497, 65881498