

SCORG[™] Setup for CFD Simulation of Twin Screw Machines with Simerics Inc. Simerics-MP+[®] Solver

SCORGTM is the CFD grid generation tool for rotary twin screw machines. The tool includes additional modules for designing and editing rotor profiles, executing a thermodynamic calculation based on quasi 1D chamber models and generating the deforming working chamber grids for selected commercial CFD solvers. For more information on the product please visit the website: <u>www.pdmanalysis.co.uk</u> or refer to documentation help.

This guide lists the steps for setting up a CFD simulation for Twin Screw Compressor with SCORG[™] and Simerics MP+ Solver. The user is expected to be familiar with screw machines, CFD and Simerics MP+ in order to be able to use these procedures. It is highly recommended that books on that topic are studied¹²

Refer SCORG[™] Installation Guide for system and hardware requirements.

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² A. Kovacevic. N. Stosic, I.K. Smith, Screw Compressor Three Dimensional Computational Fluid Dynamics and Fluid Solid Interaction, Springer, 2006, ISBN 3-540-36302-5



¹ N. Stosic, I.K. Smith, A. Kovacevic Screw Compressor Mathematical Modelling and Performance Calculation, Springer, UK 2005, ISBN-10 3-540-24275-9



1 Introduction

Screw Compressors are rotary positive displacement machines. Although the working principle of these machines is simple, the geometry of rotors which are in the form of multi -lobe helical screws meshing with each other, is making analysis by use of Computational Fluid Dynamics (CFD) challenging. The process starts when the lobes are engaged at one end, which creates continuous increase of the volume between the rotors and the casing which reduces pressure in the suction domain and draws the working fluid in. Further rotation of the rotors makes this volume between the rotors and the casing enclosed when the compression of fluid begins. This increases the pressure within the chamber. Further rotation exposes the pressurized fluid to the outlet port and the fluid is delivered (Stosic, et al., 2005). Similar process is occurring in other helical screw machines such as pumps, vacuum pumps, gear pumps, expanders, extruders and motors. The CFD is equally challenging in such machines due to sliding and stretching

The main objectives of CFD simulations of a screw compressor are to:

- a. Obtain the pressure field inside the rotor chamber and in the suction and discharge domains. Example shown in *Figure 1-1*.
- b. Obtain the velocity fields in critical regions of the computational domain.
- c. Obtain temperature fields in critical regions of the computational domain.
- d. Obtain integral parameters of the machine such as power, mass flow rate, discharge temperature, torques on the rotor shafts, etc.
- e. Obtain the loads and temperatures on boundaries with solid parts of the machine for further structural and thermal analysis.



Figure 1-1 Pressure Variation diagram of a Twin Screw Compressor (Kovacevic, et al., 2007)





This Tutorial will provide a step by step guide for the procedure to setup and execute a typical twin screw compressor, pump or motor simulation. An example of a dry air compressor with 3/5 lobe combination, L/D ratio of 1.6 and wrap angle 285 deg has been considered.

2 SCORG[™] Project

- ► Launch SCORGTM on the Desktop.
- ► Select File \rightarrow New



▶ Select N35_Template.spt \rightarrow Open

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📑 Videos									
🖳 Computer									
🏭 Local Disk (C:)									
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F	File na	ame: N35_Template.spt		▼ Scorg template (spt) (*.spt) ▼					
				Open Cancel					





► Save the project in a new folder named TwinScrewSimericsSetup → SCORG_Grid_Tutorial.spf

😫 Save As		×
💮 🕘 – 📙 « D (D	:) 🕨 TwinScrewPumplinxSetup 🕨 📼 🍫	Search TwinScrewPumplinxSet 🔎
Organize 🔻 New	folder	:= • 🔞
Documents	Name	Date modified Type
Music	SCORG_Grid_Tutorial	19/09/2014 16:56 File folder
Subversion		
📑 Videos		
P Computer Local Disk (C:) D (D:)	E	
Sham (\\CFDPC		
	III	4
File name:	SCORG_Grid_Tutorial.spf	•
Save as type:	corg Project file (spf) (*.spf)	•
Aide Folders	(Open Cancel

▶ The GUI of SCORGTM in the figure bellow shows the mains items of the front panel.







 In Units Tab, Select Length units as 'm'. This selection has to be the same as the units in which input profile coordinates are available.



- Go to Help \rightarrow Tutorials \rightarrow Folder opens
- Copy the compressor rotor profile files → [35MaleProfile_P1.dat and 35FemaleProfile_P2.dat]
- ► Copy the compressor suction and discharge port grids → [SCORG_Simerics_Tutorial_Ports_V5.0.sgrd]
- ▶ Copy the setup template \rightarrow [*SCORG_Simerics_Tutorial_V5.9.spro*]
- ▶ Paste these files in the working directory \rightarrow TwinScrewSimericsSetup



35FemaleProfile_P2.dat

SCORG_Pumplinx_Tutorial_Ports_V5.0.sgrd

35MaleProfile_P1.dat



🗼 Downloads

Recent Places

SkyDrive

📄 Libraries

SCORG[™]



Go to User Profile → Browse and Select the Male Rotor Profile from working directory.
 35MaleProfile_P1.dat

🗉 User Profile				
- Imported Profiles -			1_	
Import Male	Import Female	Reset To Imported	×	Č-60
Default Profiles				
Write To E	Default	Reset To Default		
Profile Transforma	tions		= ≛	
Apply to both	Male	Female		
Rotate (Deg)	0.00	0.00		
Scale	1.000	1.000 🚖		
Flip Coordinates				
Mirror About X				
Mirror About Y				
ACCE	PT Transform	ations		

• Click 'Yes' to overwrite P1.dat.



► Similarly Select the Female Rotor Profile.

 $35 Female Profile_P2.dat$

• Click Write To Default.





Reset To Imported Reset To Default Female
Reset To Imported Reset To Default Female
Reset To Default Female
Reset To Default Female
Female
Female
• 0.00
1.000 🚔

Click Refresh to view new profiles.



 Inspect the Rotor Profile in the GUI for gaps in the tips, starting points of the profile indicated by the small yellow circles. Below is the required orientation.







► Set Project Units to SI



• Set the following Profile Parameters to get desired clearance size:

GAPI = 0.06mm

- GAPR = 0.06mm
- GAPA = 0.05mm

*Setting GAPI = 0.06 sets the minimum interlobe clearance as the GAPI.





• Go to Geometry \rightarrow Set the following parameters:

			Rotor Configurat	ion	
			Relative Length	1.6	
			Rotor Length	0	mm
			Wrap Angle	285	Deg
			Pitch Low Pressure Port	0	mm
			Pitch High Pressure Port	t 0	mm
			Rotor Pitch	Uniform 🔫	
			Rotor Profile	Constant 💌	
			Main Rotor Centre X	0	mm
. Profile		Ш	Main Rotor Centre Y	0	mm
Profile Setup	1		Main Rotor Centre Z	0	mm
User Profile	,		Main Rotor Start Angle	0	Deg
▷ · Geometry			Rotor Stage Number	0	
> Thermodynamics			Main Rotor Helix	Right 💌	
p · Gilds			Gate Rotor Position	Right -	
Profile Setup			Machine Configu	uration	
Profile Choice	User Sp 💌		Machine Type	Compressor	•
Axis Distance	93	mm	N Gate	1	
21	3		Compression Start	0	
22	5		Compression End	161.001	
	0.06	mm	Volume Index	1.8	
GAPI			E Rotor	211	
API APR	0.06	mm			
iapr iapr iapa	0.06	mm mm	αL Rotor	1E-05	
API APR APA	0.06 0.05	mm mm	αL Rotor E Casing	1E-05 211	
GAPT GAPR GAPA Clearance Distribution	0.06 0.05 Clearences	mm mm	αL Rotor E Casing αL Casing	1E-05 211 1E-05	

• Go to Thermodynamics \rightarrow Set the following parameters:

Working Conditions								
Wtip	66.6665	m/s						
Rotor Speed	10000	RPM						
P0	100000	Pa						
Pr	300000	Pa						
то	293	К						
Tr	350	К						
Теvp	268	K						
Tcond	313	K						
T Ambient	293	K						
Ts	0	K						
x	1							

► Save the Project.





3 SCORG[™] Mesh Generation

SCORG[™] is stand-alone numerical CAD-CFD interface used to generate a numerical mesh of rotating parts of a screw machine and to transfer it to a general finite volume numerical solver. The program generates a block structured hexahedral numerical grid for rotor flow domains, solid rotor domains, inlet and outlet ports.

Inputs Required

In this step the rotor domain mesh is generated in SCORGTM. The inputs required for this mesh generation are: (Kovacevic, et al., 2007).

Control Parameters:

- Type of the machine.
- Number of mesh divisions along the lobe in circumferential direction.
- Number of mesh divisions in radial direction.
- Number of Angular divisions of the rotation.

Control Switches:

These Inputs are used to specify the method used for Rotor Profile Input and the required mesh calculation options.

- Click Grid Module in the project tree
- In Mesh Type Size set:
 - \circ Circumferential Main = 0
 - \circ Circumferential Gate = 60
 - \circ Radial = 8
 - \circ Angular = 50
 - \circ Interlobe Divisions = 50

Rotor Mesh Size		
Circumferential Divisions Main Rotor	0	
Circumferential Divisions Gate Rotor	60	
Radial Divisions	8	
Angular Divisions	50	
Axial Divisions	0	
Interlobe Divisions	50	

Distribution Parameters:

These inputs are used for adaptation and distribution of the grid points on the boundaries of the domain and for smoothing of rack (Rack is the curve representing a rotor with infinite radius which uniquely separates the flow domains of the male and female rotors).

• Type of Distribution \rightarrow Casing to Rotor Conformal

Distribution Parameter	ers	
Type of Distribution	Casing to Rotor Conformal	ŀ
K Main	3	Γ
K Gate	0.3	
Rack Smoothing Factor	0.8	
Project on Main profile	Yes	\sim





• Meshing Parameters:

Meshing parameters provide control over the distribution of the internal mesh points in each cross section of the rotors.

Meshing Parameters	
Mesh Orthogonality and Sm	
Relaxation Factor (0 - 1)	1
Tolerance Factor (1 - 100)	100
Inflation Layer Control	
Radial Bias Factor (0 - 1)	0.5
Radial Bias Intensity (1 - 10)	1

- \circ both the distribution and meshing parameters can be changed later
- Start Grid Generation through a three step process as below.
- Select Rack Refinement Points = 500

Control Switches		
Rack Generation	Off	~
Rack Refinement Points	500	
Boundary Generation	Off	~
Fluid Rotor Grid	Off	~
Solid Rotor Grid	Off	~
Inlet Port Grid	Off	~
Outlet Port Grid	Off	~
Preprocessor Input File	Simerics-MP+	~
Vertex Files Start Number	1	
Vertex Files End Number	50	

Click Numerical Rack Generation

File	Edit	Run	View	Units	Help										
	7 🛃	<u> </u>		2 X I	Ê 🕥	۵	09 🔘	10	0 🔽	STOP	1	G	T	\bigcirc	\bowtie

This operation produces the rack curve between the two profiles. It is required to be executed only once in the grid generation process.







Click Boundary Distribution Generation

File	Edit	Run	View	Units	Help						_								
	i 🚽	<u> </u>		2 ×	ê 🕥	%	0	٢	C	Ľ	ø	0	-	STOP	1	G	T	Ó	M
Inputs	Prop	perties	Units						(Use	r Pro	file	×						

Information about the progress of the selected activities in the meshing procedure is displayed in the output window. Any warning or error and their locations are indicated. If errors occur, it is important to manually tune the input parameters which will produce a mesh without errors. Graphically the mesh distribution in each section can be visualized and checked for any deviation from requirements. The detailed description of methods used for distribution, adaptation and generation of numerical mesh is available through the Help in the drop down menu.

Inspect report and check that there are no distribution warnings listed





C:\SCORG\Grid>echo off

InstallPath = C:\SCORG ProjectPath = D:\TwinScrewCFXSetup\SCORG_Grid_Tutorial
SCORG - Screw COmpressor Rotor Geometry grid generator V.5.9
Screw compressor/p Wrap = 283.2 RPM=12344. Vel= 82.3 Ncel= 566400 Z1/Z2= 3/5 d1=127.38 [mm] d2=120.32 [mm] a= 93.00 [mm] len=216.45 [mm]
Nfi Nr Nz Nadd Rot Rack Boun Mesh RotM InpP OutP Prep RaSm Line Oil 60 8 118 50 3 1 1 0 0 0 0 0 1 1 0
Calculation: ROTOR 1: 0.00 Dist 0.00 Cos 2: 0.00 Ang. 0.00 Sin Calculation: RACK Smoothing factor: 0.80 Smooth: ON Calculation: BOUNDARY Male = 300 Female = 300 Initial Smoothing Distribution:Casing to Rotor Conformal TFI_Mesh routine - Rotor 1 TFI_Mesh routine - Rotor 2 Initial Smoothing GRID RelaxFac, TolFac, RadBFac, RadBInt, InterlobeBInt 1.0 100 0.5 1.0 2
Distribution Type: Casing to Rotor Conformal
Distribution: Casing to Rotor Conformal
Cell statistics Overall number of cells 0 .Rotor fluid 0 .Inlet port 0 .Rotor solid 0 .Outlet port 0
Start: 11:23:18End: 11:24: 2Running time: 0h: 0m:43s =42 sec3/ 3/20213/ 3/2021SCORG - Screw COmpressor Rotor Geometry grid generator - Ver. 5.9

▶ Click Distribution Mesh to visually inspect the distribution in each cross section

🚼 D:\TwinScrewCFXSetup\SCORG_Grid	_Tutorial	
File Edit Run View Units	Help	
🗋 📽 🔙 🍠 🔷 🖉 🔅 🎽	🕻 💼 I 📀 🚭 🚸 🐷 💿 🚺	<u>e</u> 🕂 鼶 🖸
Selections Properties	User Profile 🗙	Distribution Mesh
▷ SCORG_Grid_Tutorial	*	bistibution mesh
⊳ Geometry		
D · Thermodynamics		







▶ In the Distribution Display \rightarrow Select Quality Criteria = Error Cell

2
E
ors: 0 ors: 0

- Inspect all the distribution positions and ensure that 0 error are reported in each position.
- Click Rotor Grid Generation

File	Edit	Run	View	Units	Help														
	j 🛃	~ ^		C X	Ê 🕥	۶	6	٢	6 0	1 🖉	0	-	STOP	5	G	T	$\langle \rangle$	×	
Innuta			11-3-						(Leer Prof	ماة	2							

▶ Inspect report and check that there are no grid errors listed







C:\SCORG\Grid>echo off

```
. . . . .
                                                             InstallPath = C:\SCORG
ProjectPath = D:\TwinScrewCFXSetup\SCORG_Grid_Tutorial
SCORG - Screw COmpressor Rotor Geometry grid generator V.5.9
Screw compressor/p Wrap = 283.2 RPM=12344. Vel= 82.3 Ncel= 566400
Z1/Z2= 3/5 d1=127.38 [mm] d2=120.32 [mm] a= 93.00 [mm] len=216.45 [mm]
                                .....
Nfi Nr I
              . . . . . . . . . . . . . . . . .
 NFi Nr Nz Nadd Rot Rack Boun Mesh RotM InpP OutP Prep RaSm Line Oil
60 8 118 50 0 0 0 1 0 0 0 0 1 1 0
                                                                                  0
         . . . . . . . .
                         . . . . . . . . . . . . . . . .
                                            . . . . . . . . .
Calculation: FLUID GRID RelaxFac, TolFac, RadBFac, RadBInt, InterlobeBInt
                                  1.0
                                          100
                                                 0.5
                                                             1.0
 TFI_Mesh routine - Rotor
TFI_Mesh routine - Rotor
                                         1
                                         2
 PDE_mesh routine - Rotor
PDE_mesh routine - Rotor
                                         1
                                          2
 PDE_Interlobe_mesh2 routine: Smooth Interlobe
            . . . . . . . .
 Check_Grid - Rotor:
Check_Grid - Rotor:
                                    1
                                    2
 Write 2D Grid Data
 Grid Data Count:
Male rotor domain, Vertices: 321300, Cells
Female rotor domain, Vertices: 321300, Cells
                                                      283200
                                                      283200
Written Control.dat
                          Overall number of cells
Cell statistics
                                                                0
                        0
                            .Inlet port
.Rotor fluid
                                                               0
.Rotor solid
                       0
                                                               0
                                       .Outlet port
Start: 11:29:31 End: 11:29:42 Running time: Oh: Om:10s = 2 sec
3/ 3/2021...
SCORG - Screw COmpressor Rotor Geometry grid generator - Ver. 5.9
. . . . . . . .
```

• Click Rotor Grid 2D Mesh to visually inspect the grid in each cross section







• Click Quality Critera \rightarrow Error Cell and Inspect.

▶ ● 会 Ц ◎ ● 7 № ↓ ◎ ○ ≥ ●									
User Profile X	Rotor Grid ×								
Distribution:	Mesh:	Quality Criteria:	Show Lines Quality Report	t					
	la de la dela dela dela dela dela dela d						Main Errors: 0 Gate Errors: 0		

• Click Quality Critera \rightarrow Orthogonality and Inspect.









- ▶ In Control Switches \rightarrow Preprocessor Input File select \rightarrow Simerics-MP+
- Set Vertex Files Start = 1
- Set Vertex Files End = 50

G Control Switches										
Rack Generation	Off	~								
Rack Refinement Points	500									
Boundary Generation	Off	~								
Fluid Rotor Grid	Off	~								
Solid Rotor Grid	Off	~								
Inlet Port Grid	Off	~								
Outlet Port Grid	Off	~								
Preprocessor Input File	Simerics-MP+	~								
Vertex Files Start Number	1									
Vertex Files End Number	50									

Calculate Preprocessor Files Generation





File Edit Run View Units Help
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Generation of Rotor Pre Processor files checking volumes in Male Min/Max Volume= 2.5494173E-11 2.4967806E-08 Boundaries: Rotor_male Casing_male Axial_male Axial_male Axial_male Checking volumes in Female Min/Max Volume= 1.8902525E-11 3.7128007E-08 Boundaries: Rotor_female Axial_female Axial_female Axial_female Axial_female I Boundaries: Rotor_rotor Casing_rotor Axial_rotor Axial_rotor Axial_rotor Casing_rotor Casing_rotor Casing2_rotor Casing2_rotor Casing2_rotor Casing2_rotor Casing2_rotor Casing2_rotor Casing2_rotor
Simerics-MP+ SETUP Grids written
Generation of time step grid files Start time step: 1 End time step: 50
Rotor 1, Grid position 1 Rotor 1 Grid position 2

- ▶ With this the SCORG Project is complete and the Simerics-MP+ setup can be started.
- ► In the directory structure of SCORG Project → Grid → Output consists of Simerics-MP+ folder.
- ► Copy files in this folders to the project working directory → TwinScrewSimericsSetup
- ► These are Rotor grids and the Simerics Template Setup







► The highlighted files are required for full setup.



4 Simerics MP+ case setup

- Launch Simerics MP+
- ▶ Select Open \rightarrow New \rightarrow Import port and singlerotor grid

Save as [*TwinScrew35_Compressor.spro*]





Mesh	Model	Simulation	Results		₽×				
Import/Export Geometry or Grid									
Split/Combine Geometry or Grid									
Transform Geometry or Grid									
Grid	and Geom	etry Informa	tion						
Gene	ral Meshe	r							
lemplate Mesh/Surface									
Koto	r lemplate	Mesher							
Valve lemplate Mesher									
Properties & X									
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opertie:	8 📦	1	Import G	rid From Simerics G	rid File				
operties	🎖 👔	\$	Import G	rid From Simerics G t Grid	rid File				
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🖧 Select File					
← → · ↑ 📙 « Twin	nScrewCFXSetup > SCORG_Grid_Tutorial > Gri	d > Output > Simerics	-MP+ v	ට Search	Simerics-N
Organise 🔻 New folder					
📥 OneDrive - City, U ^	Name	Date modified	Туре	Size	
On Drive Deven	FemaleRotor.sgrd	03/03/2021 14:24	Simerics Grid File	17,640 KB	
OneDrive - Person	🗎 MaleRotor.sgrd	03/03/2021 14:24	Simerics Grid File	17,640 KB	
🧿 Qsync	SCORG_Simerics_Tutorial_Ports_V5.9.sgrd	09/08/2019 09:14	Simerics Grid File	25,644 KB	
This PC	SingleRotor.sgrd	03/03/2021 14:24	Simerics Grid File	34,959 KB	
3D Objects		·			
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b Music					
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Work (D:)					
File na	me: SingleRotor.sard			✓ Simer	ics Grid File
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► Click Screw Module \rightarrow Save As \rightarrow SCORG_Simerics_Tutorial_V5.9.spro

📙 🛃 🔒 🗧 Simerics-MP+					_		×
File Home Share View							~ 🕐
← → × ↑ 🔤 « SCORG_Grid_Tut	ō		Ą				
 Qsync This PC 3D Objects Desktop Documents Downloads Music Pictures Videos Windows (C:) Work (D:) 	rotor.1 rotor.2 rotor.3 rotor.4 rotor.5 rotor.5 rotor.6 rotor.7 rotor.8 rotor.9 rotor.10 rotor.11 rotor.12 rotor.13	rotor.16 rotor.17 rotor.18 rotor.19 rotor.20 rotor.21 rotor.22 rotor.23 rotor.23 rotor.24 rotor.25 rotor.26 rotor.27 rotor.28	rotor.31 rotor.32 rotor.33 rotor.34 rotor.35 rotor.36 rotor.37 rotor.38 rotor.39 rotor.40 rotor.41 rotor.42 rotor.43	 rotor.46 rotor.47 rotor.48 rotor.50 SCORG_Simerics_1 SCORG_Simerics_1 SCORG_Simerics_1 SingleRotor.sgrd 	Futorial_Port Futorial_V5.9 Futorial_V5.9	ts_V5.9.s).sgrd).spro	grd
💣 Network	rotor.14	rotor.29	rotor.44				
♥ 54 items				-			

Copy rotor.1, rotor.2 etc files to the working directory.

► View Geometric Entities by Type:







► Add Flow-Turbulence and Heat modules.







• Select all volumes and set Ideal Gas Law.

Properties		1 X	suction_inlet suction_mgi_screw suction_wall	
🕌 🛞 Model 🛭 🥡 Geometr	y 🐞 View		✓ ✓ Interfaces	
✓ Common				V Volumes
✓ Density	Ideal Gas Law	.		✓ DischargePort
Minimum Pressure	0.1	Pa		Fluid_rotor
Molecular Weight	28.97	kg/kmol		SuctionPort
Compression Factor	1			Built Meshes
Porosity	No	*		DischargePort
> Common Output				Fluid_rotor
Volume Remesh	No	-		SuctionPort
V Flow				
> Viscosity	Constant Dynamic V	iscos 🔻		
Resistance Model	No	*		I ↓Y
> Output				
Noninertial Frame	No	*		
> Initial Condition	Specified Values	*		Σ • Χ
Create a New Source	No	*		

Select Fluid_rotor and Set Volume Remesh

			discriarge_waii ✓ suction_inlet ✓ suction_mgi_screw
Properties e >		ъх	Suction_wall
🔄 🛞 Model 🛛 🕅 Geometr	y 🐞 View		↓ Interlobe_rotor
✓ Common		~	Volumes
> Density	Ideal Gas Law	-	DischargePort
Porosity	No	-	Fluid_rotor
> Common Output			SuctionPort
 Volume Remesh 	Volume Remesh	-	Built Meshes
Method	External Grid File	-	> DischargePort
Base Name	rotor.		Fiuld_rotor
Files Found	50		
Header Lines	1		
Skipping Files	0		
Cyclic	Yes	-	N N
Y Flow			
> Viscosity	Constant Dynamic Viscos	-	
Resistance Model	No	-	τ x

- Create Interfaces
- ► 1 Axial Suction













▶ 4 – Radial Discharge Gate Rotor









• *Rotor1_rotor* has following properties:



Rotor2_rotor has following properties:



Set Inlet







Set Outlet



- Go to Geometry tree \rightarrow Select *Rotor1_rotor* and *Rotor2_rotor*
- ► Go to Results \rightarrow Select Pressure



▶ Create a monitor point at (0.0, 0.062,0.203) for tracking Pressure history







While Point01 is active in the selection, Click → Add XY Plot → Select Pressure
 → Plot



Similarly create Plots for Mass Flux through the *suction_inlet* and *discharge_outlet* boundaries.







► Save the project

5 Simerics MP+ Solver Calculation

• Go to Simulation tab \rightarrow Click Start



SCORG_Simerics_Tutorial_V5.9.spro - Simerics MP+





The time step size is controlled by the number of divisions used for angular discretization during grid generation in SCORG.

- Simulation Residual Plot 1 Plot 2 đΧ Results Velocity Pressur -0,2 ic Energy Turbulent Energy Dissipation Rate Temperatur -0.4 Drop Drop Residual I -1.2 -1.4 10 16 18 20 22 24 2 12 14 Iteration 14 0.0001 (2) B
- Monitor the convergence in residuals:

 Pressure contours on the rotor profile can be seen updated by selecting the boundaries in geometric tree.



6 Summary

This document describes the steps to setup a Simerics MP+ model for Screw compressor CFD analysis starting from output data generated by SCORG[™] Meshing tool. More detailed information on using SCORG and Screw compressor mesh generation can be found in user guide (SCORG, 2021). The Screw Module built in Simerics MP+ provides a very fast and user friendly setup procedure. It is possible to make quick changes in the grids and simply update the model by replacing the grid. The setup can be easily duplicated to users own port grids by





editing the *.spro* file in an ordinary text editor. More detailed information on using Simerics MP+, Transient simulations and Post-Processing can be found in user guide (Simerics, 2021)

7 Bibliography

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