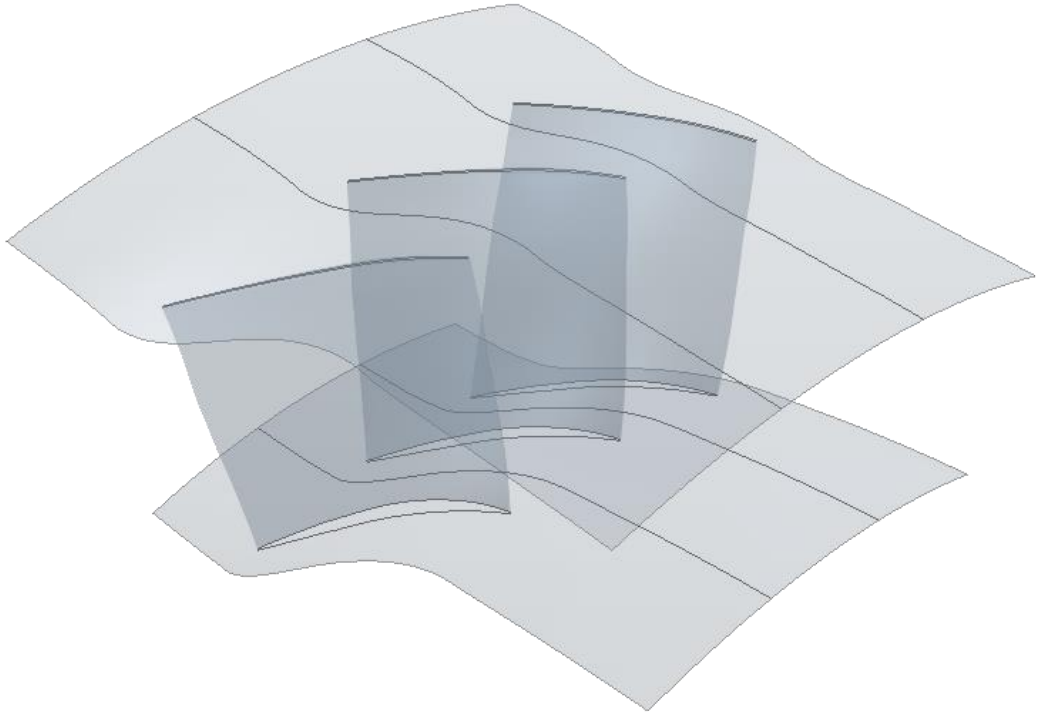
CFD applied to Turbomachinery

Francesco Romanò

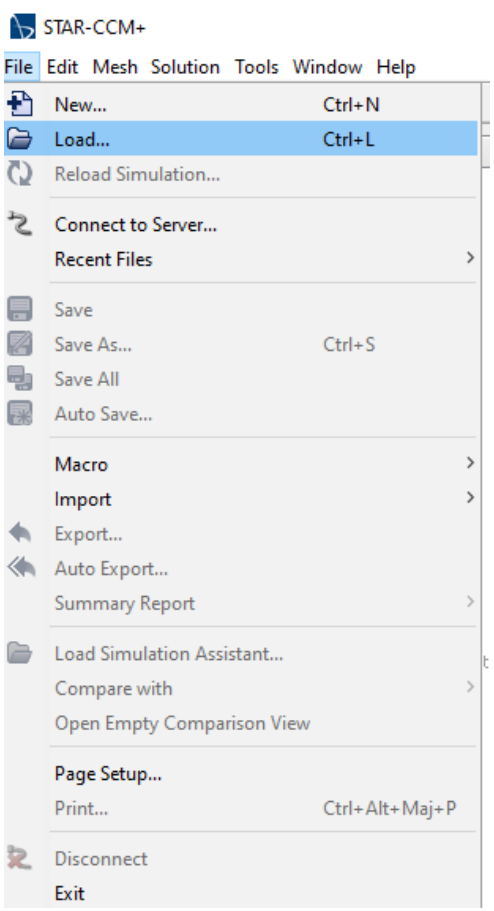
francesco.romano@ensam.eu

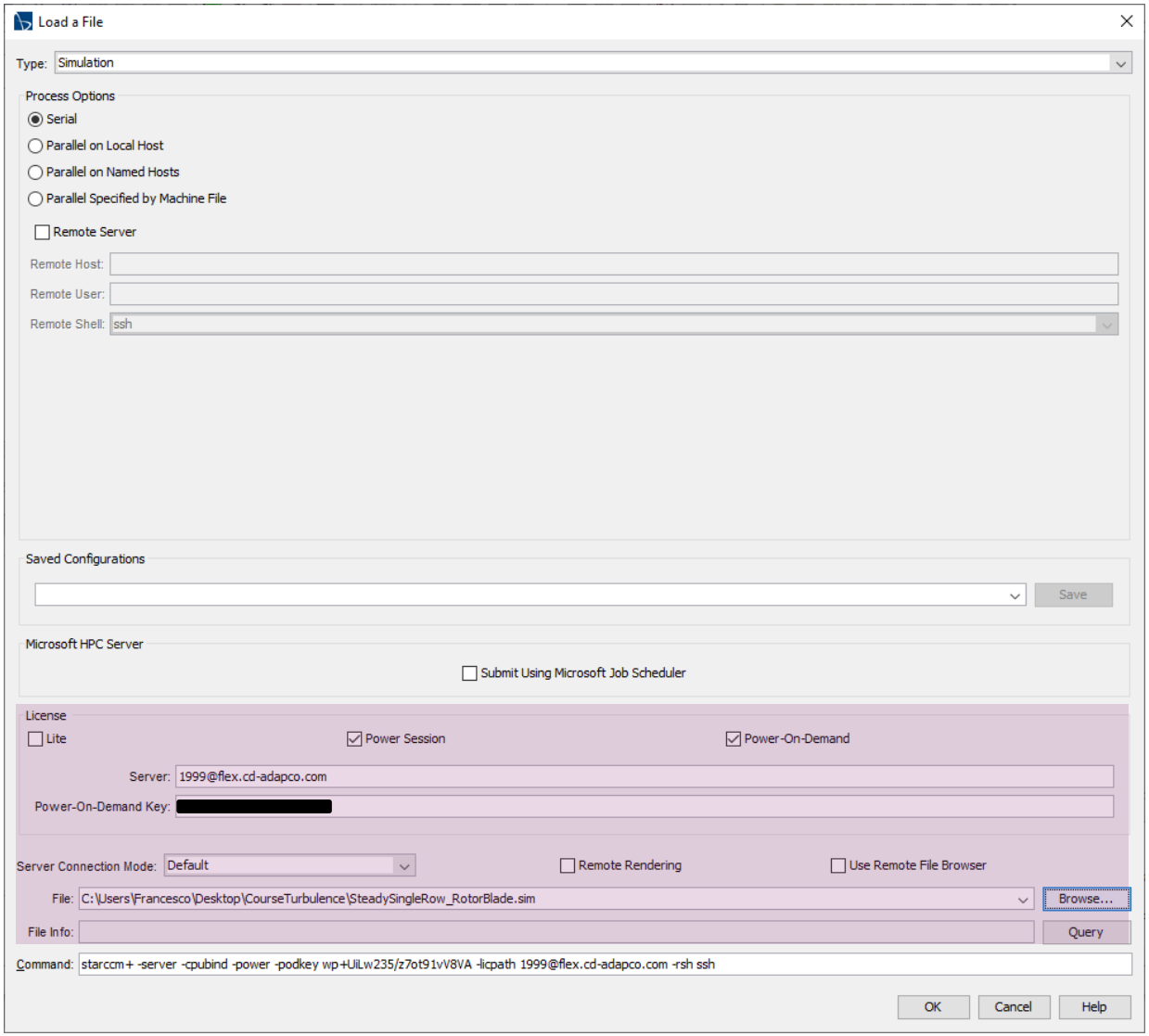
Laboratoire de Mécanique des Fluides Lille, Arts et Métiers Institute of Technology, 59800, Lille, France



March 17, 2021, International Master of Turbulence

Harmonic Balance for Rotor Blade in StarCCM+





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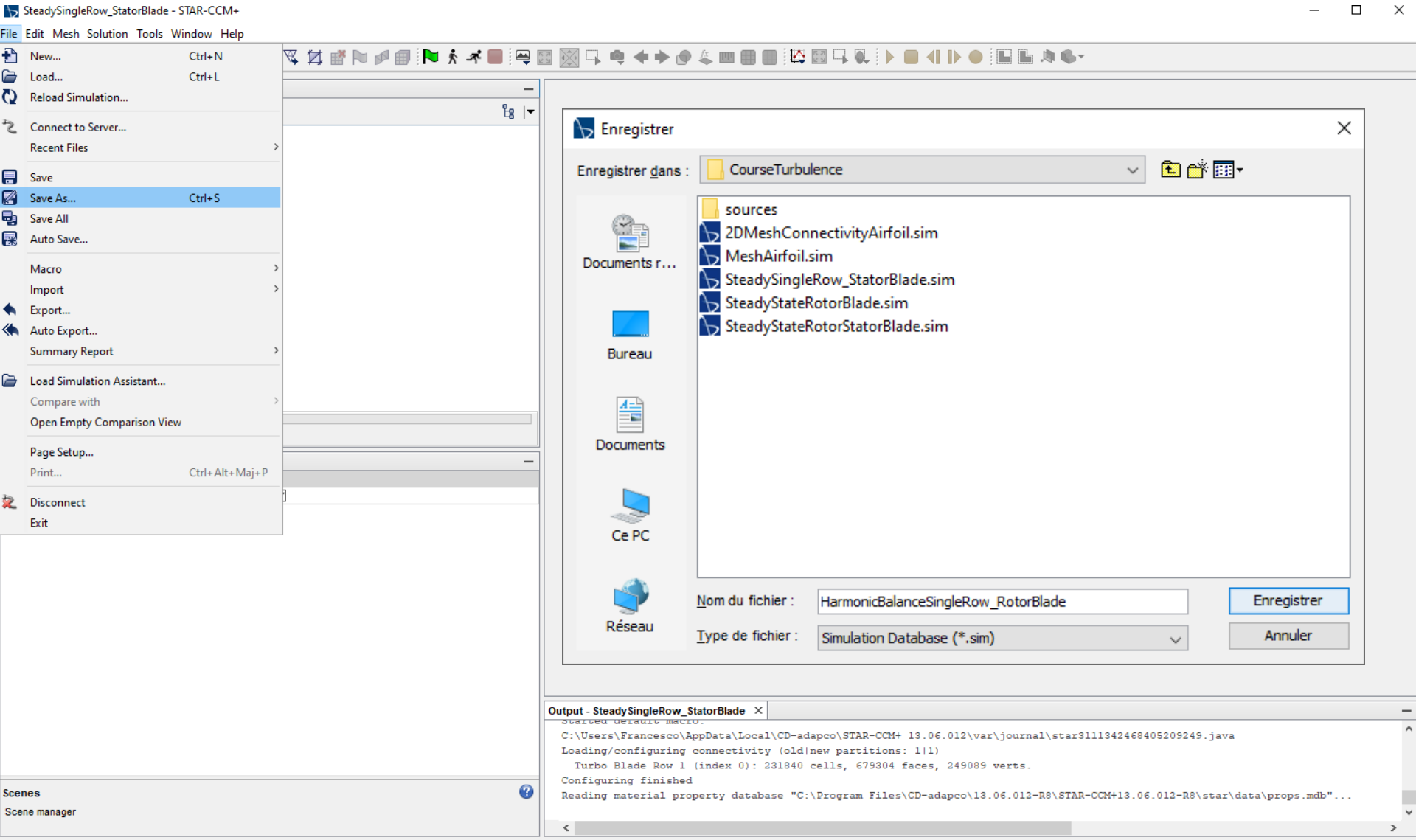

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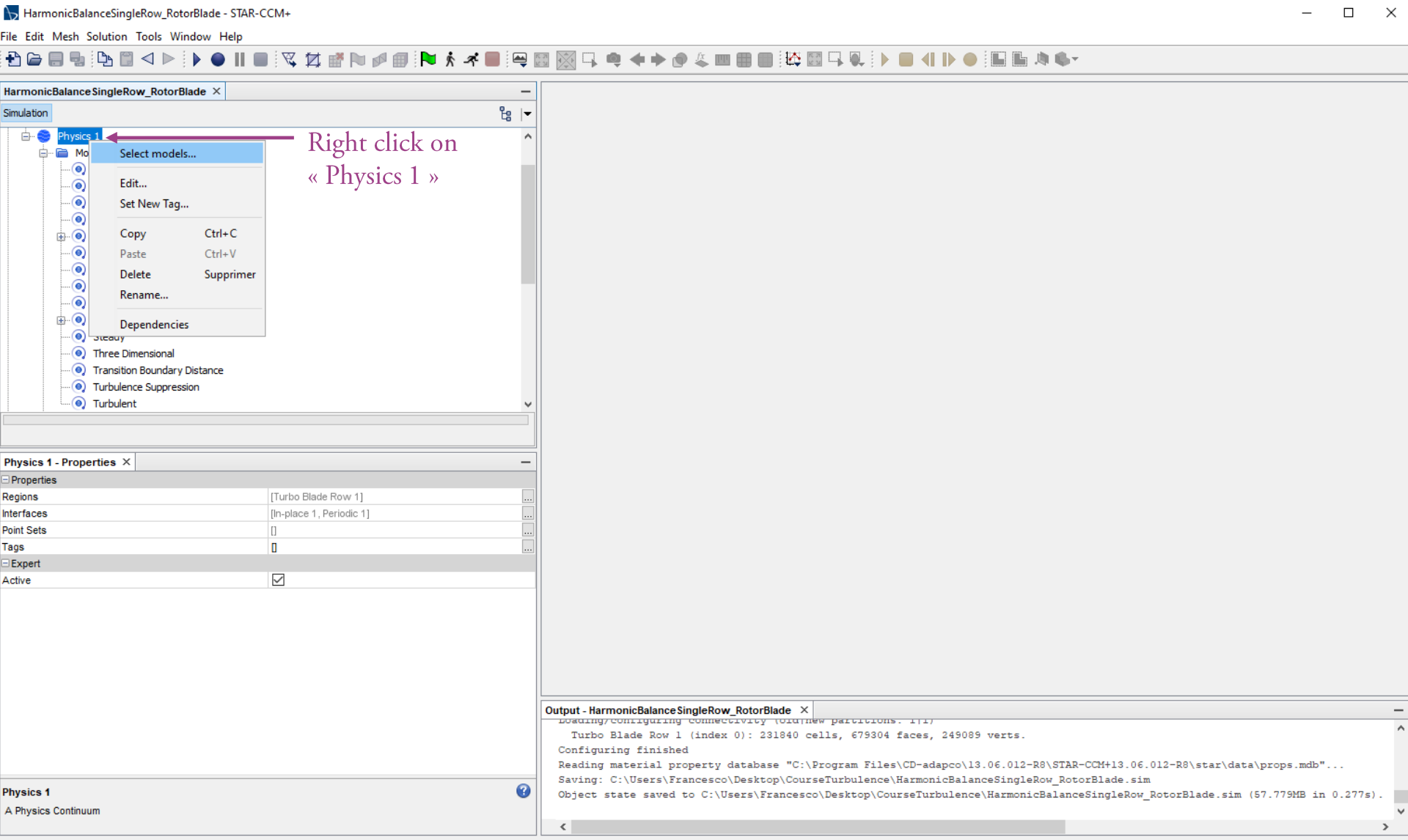

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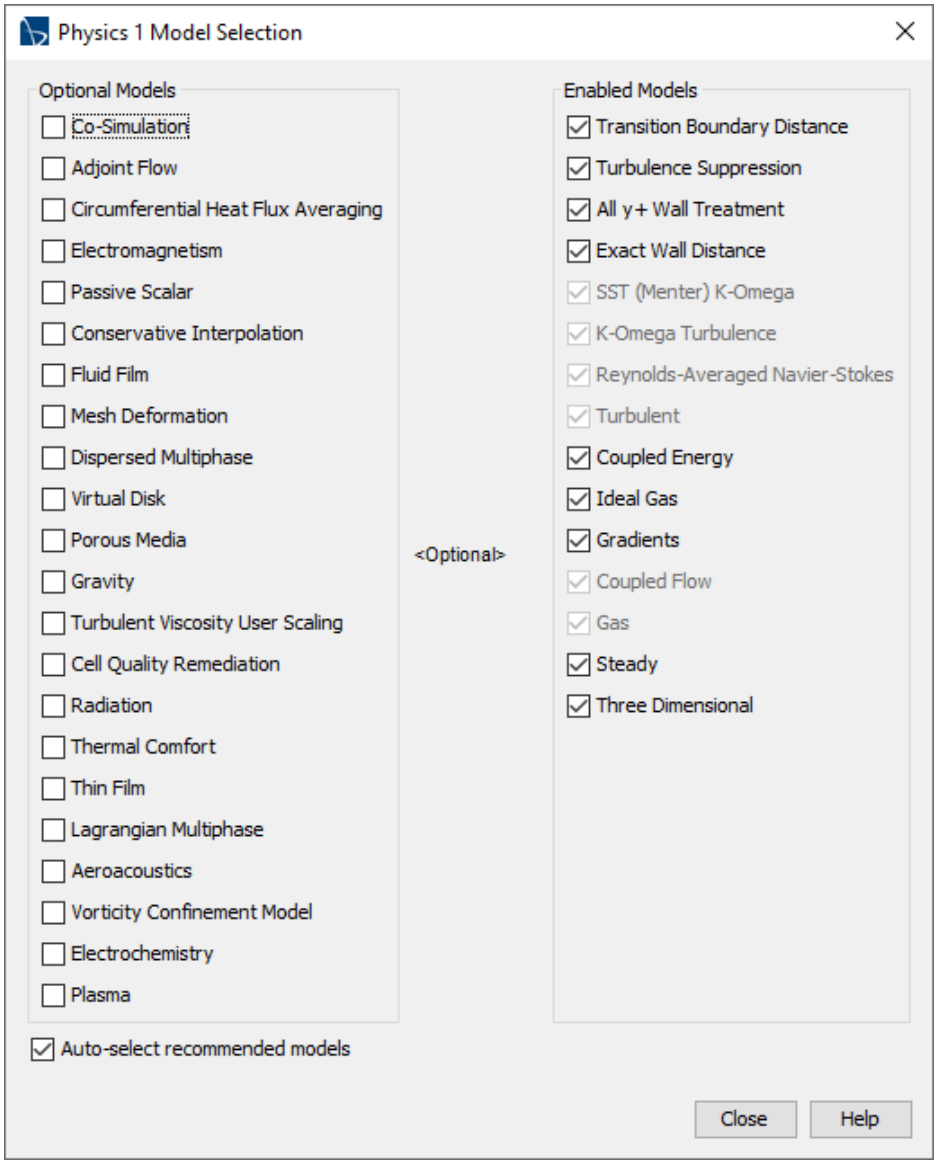
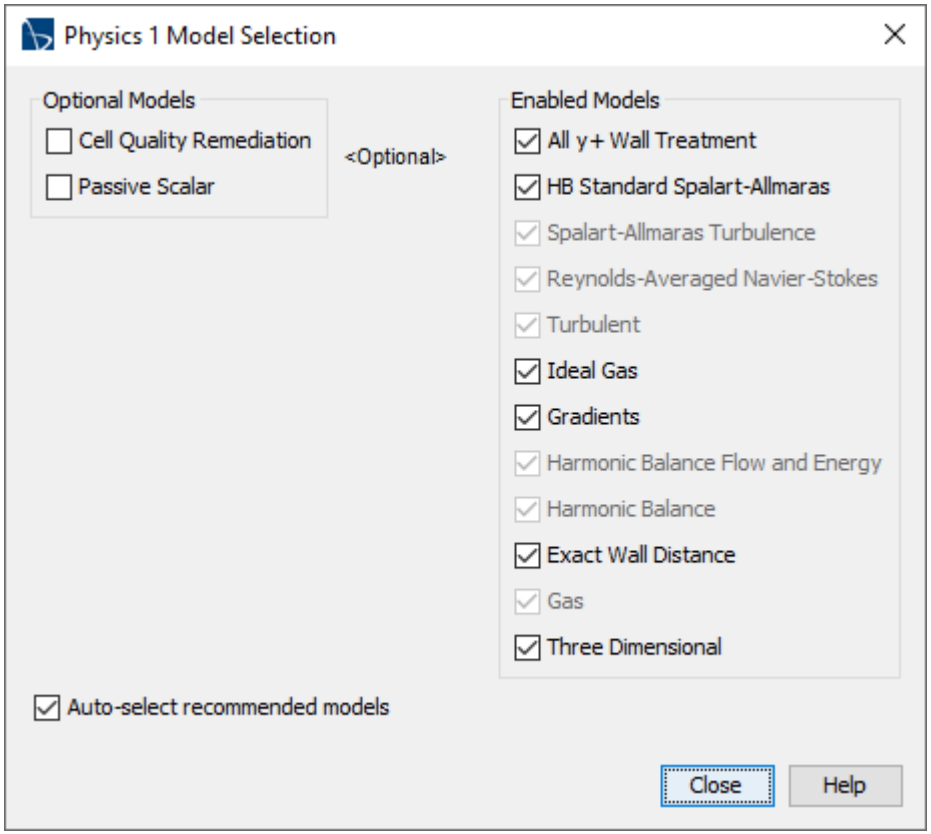


Deactivate:

- Transition Boundary Distance
- Turbulence Suppression
- All y+ Wall Treatment
- SST (Menter) K-Omega
- K-Omega Turbulence
- Reynolds-Averaged Navier-Stokes
- Turbulent
- Coupled Energy
- Ideal Gas
- Coupled Flow
- Steady

Harmonic Balance for Rotor Blade in StarCCM+



Activate:

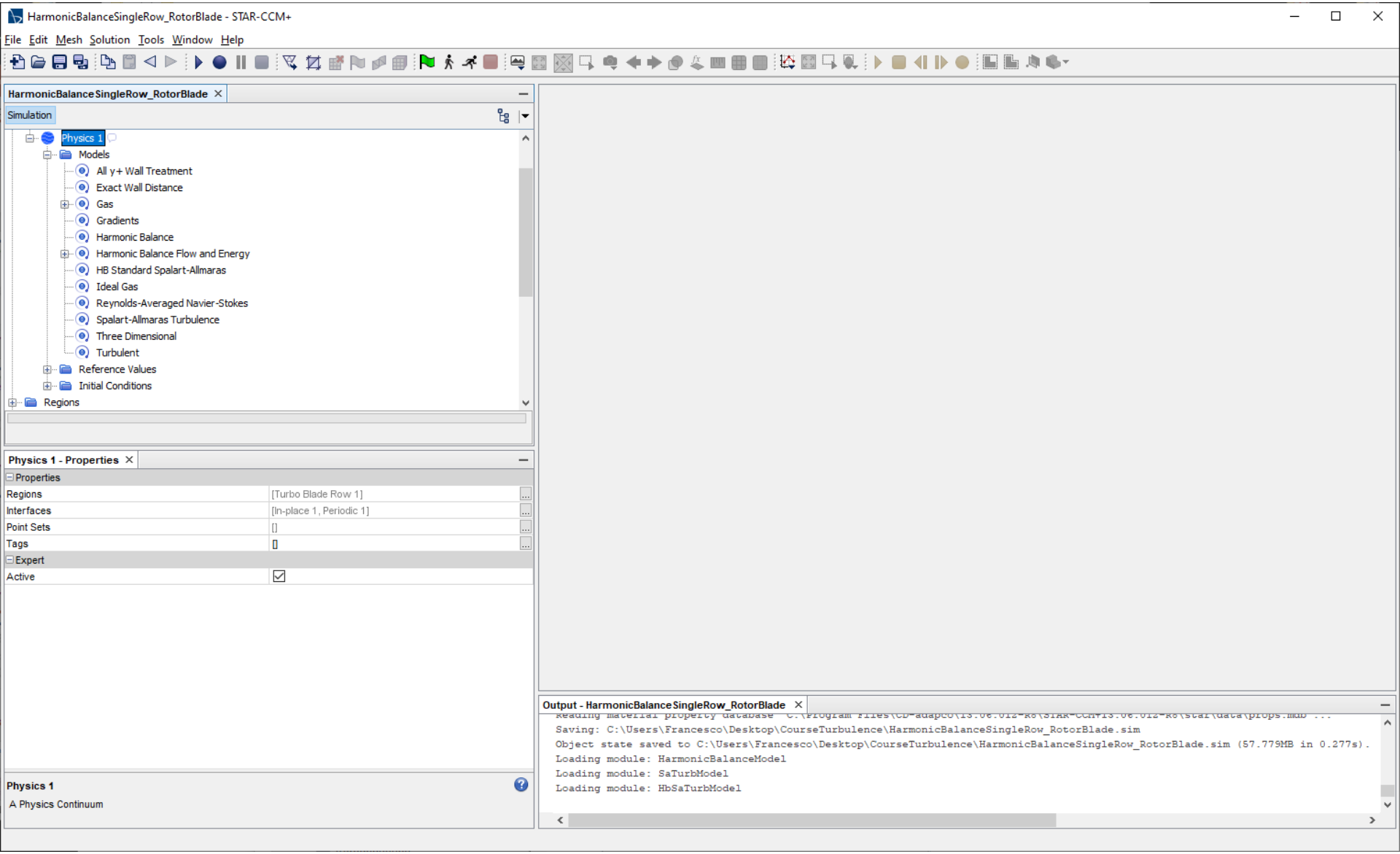
- Harmonic Balance
- Turbulent
- Spalart-Allmaras Turbulence

By « Auto-select recommendend models »:

- HB Standard Spalart-Allmaras
- All y+ Wall Treatment
- Exact Wall Distance

Click « Close »

Harmonic Balance for Rotor Blade in StarCCM+



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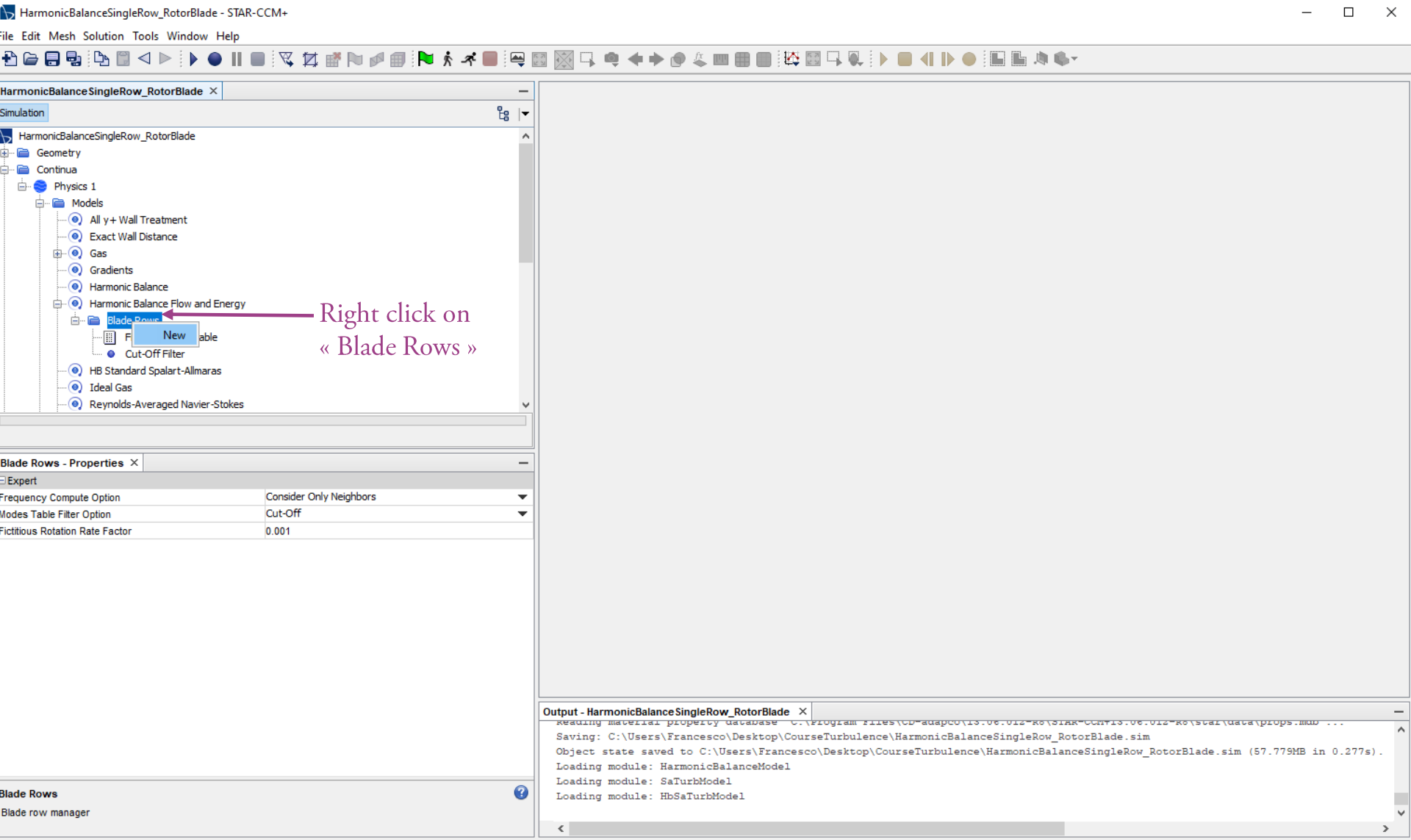

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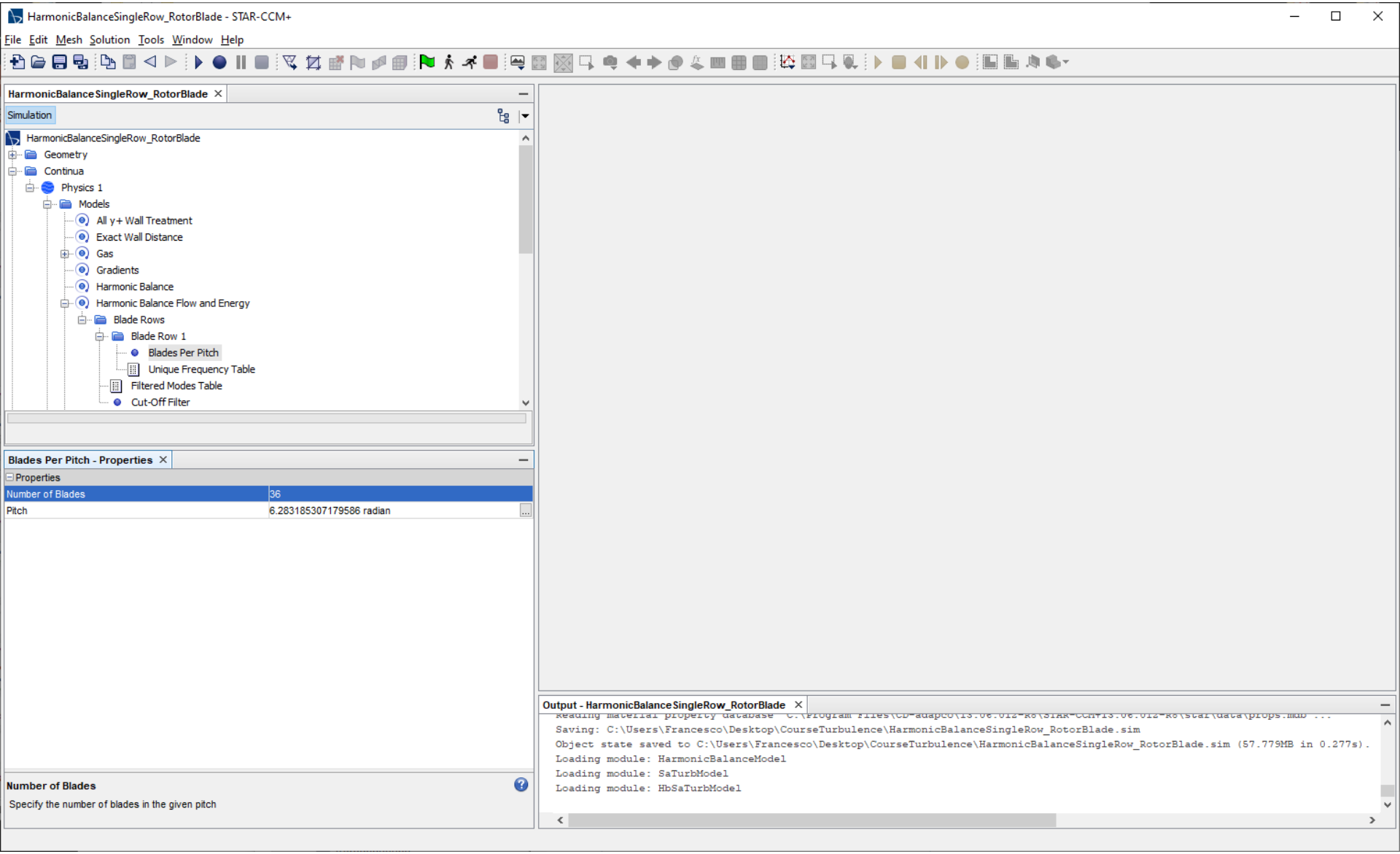

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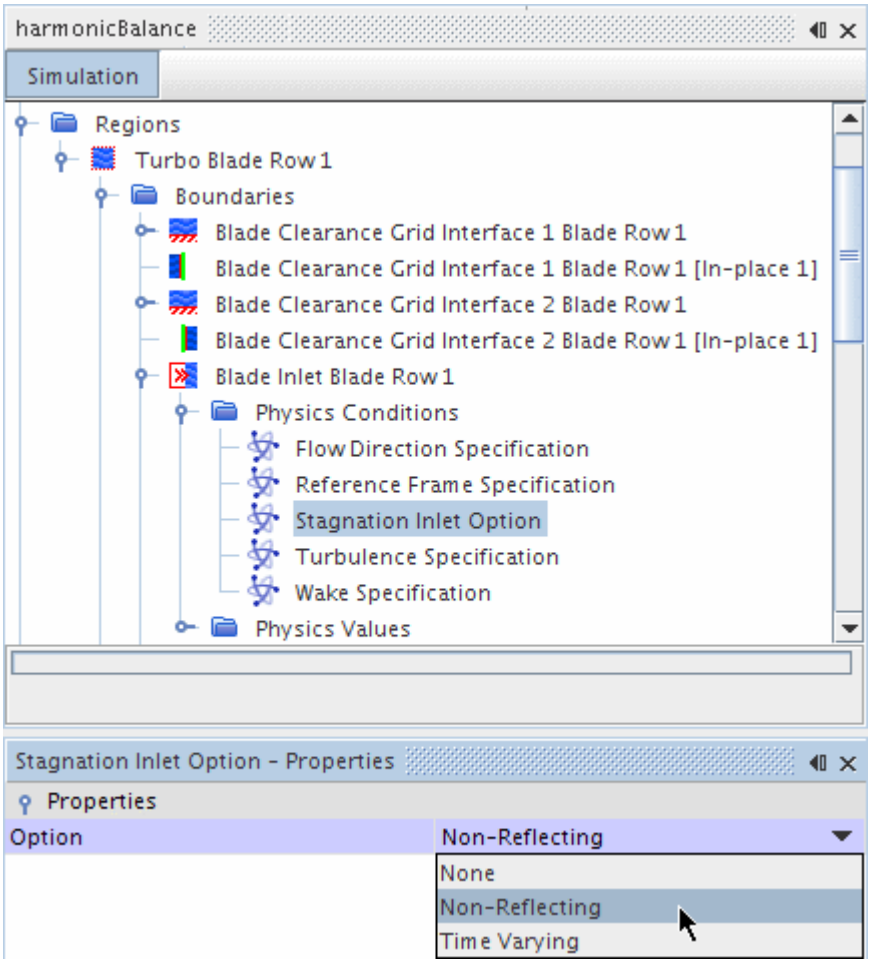

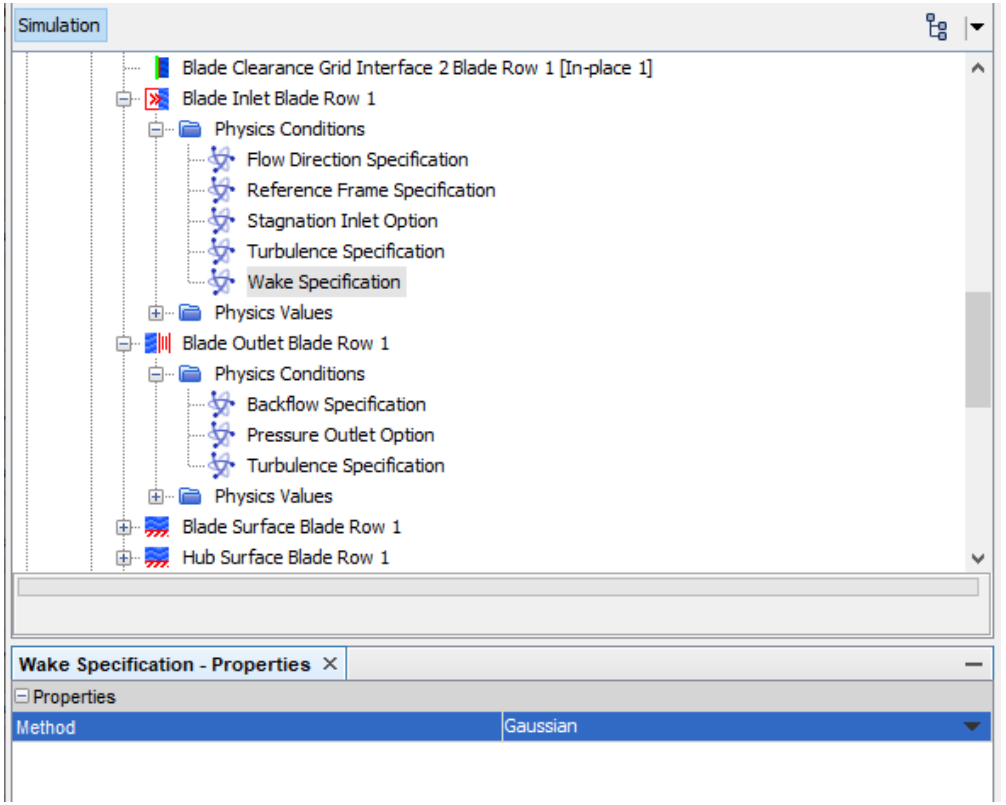

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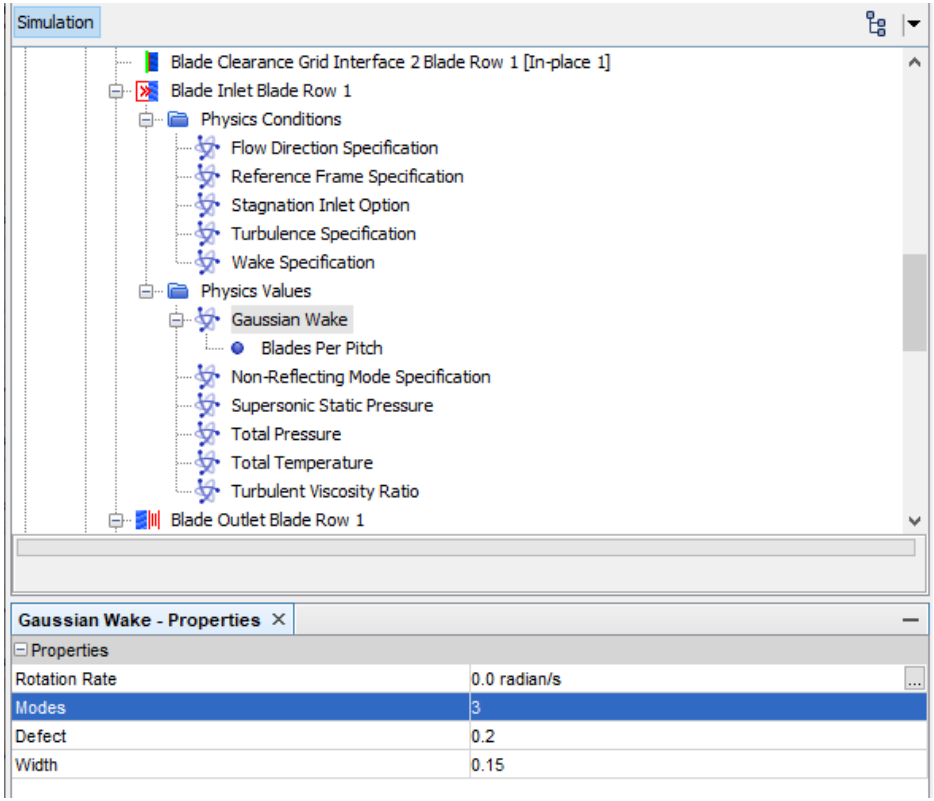

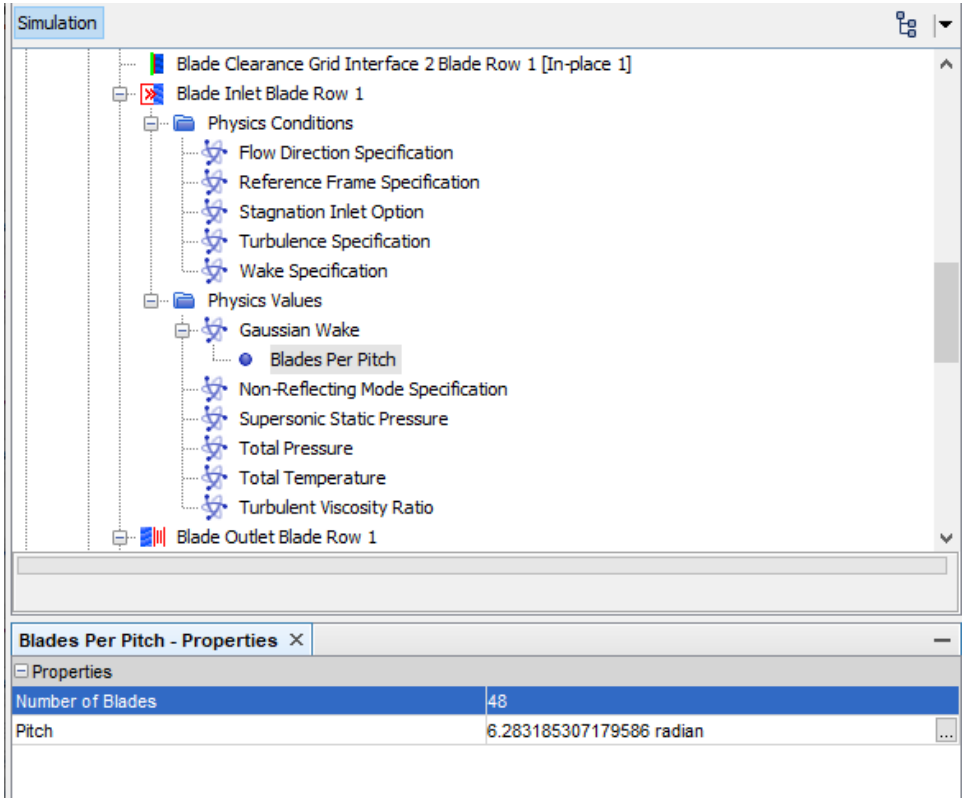

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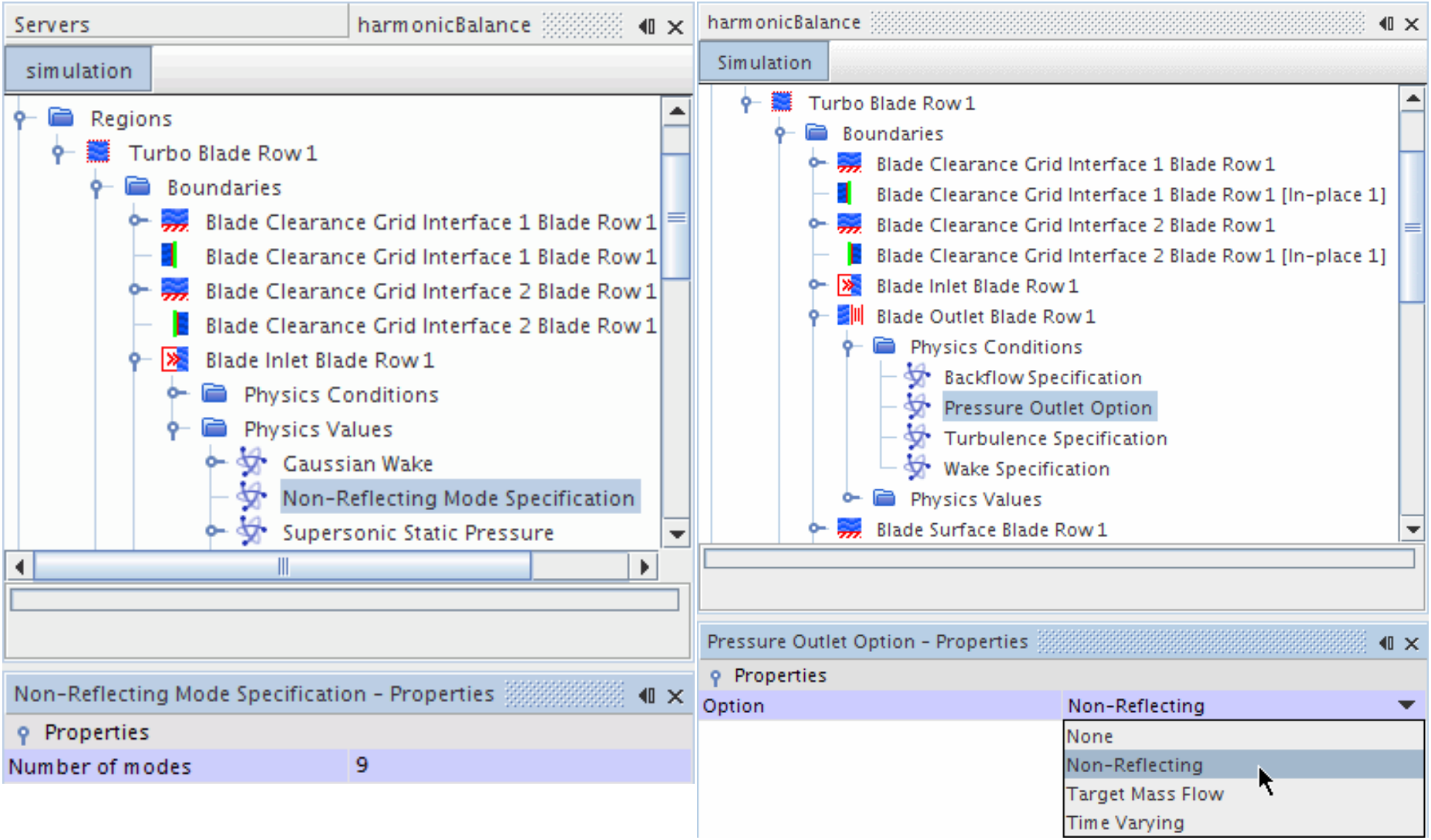

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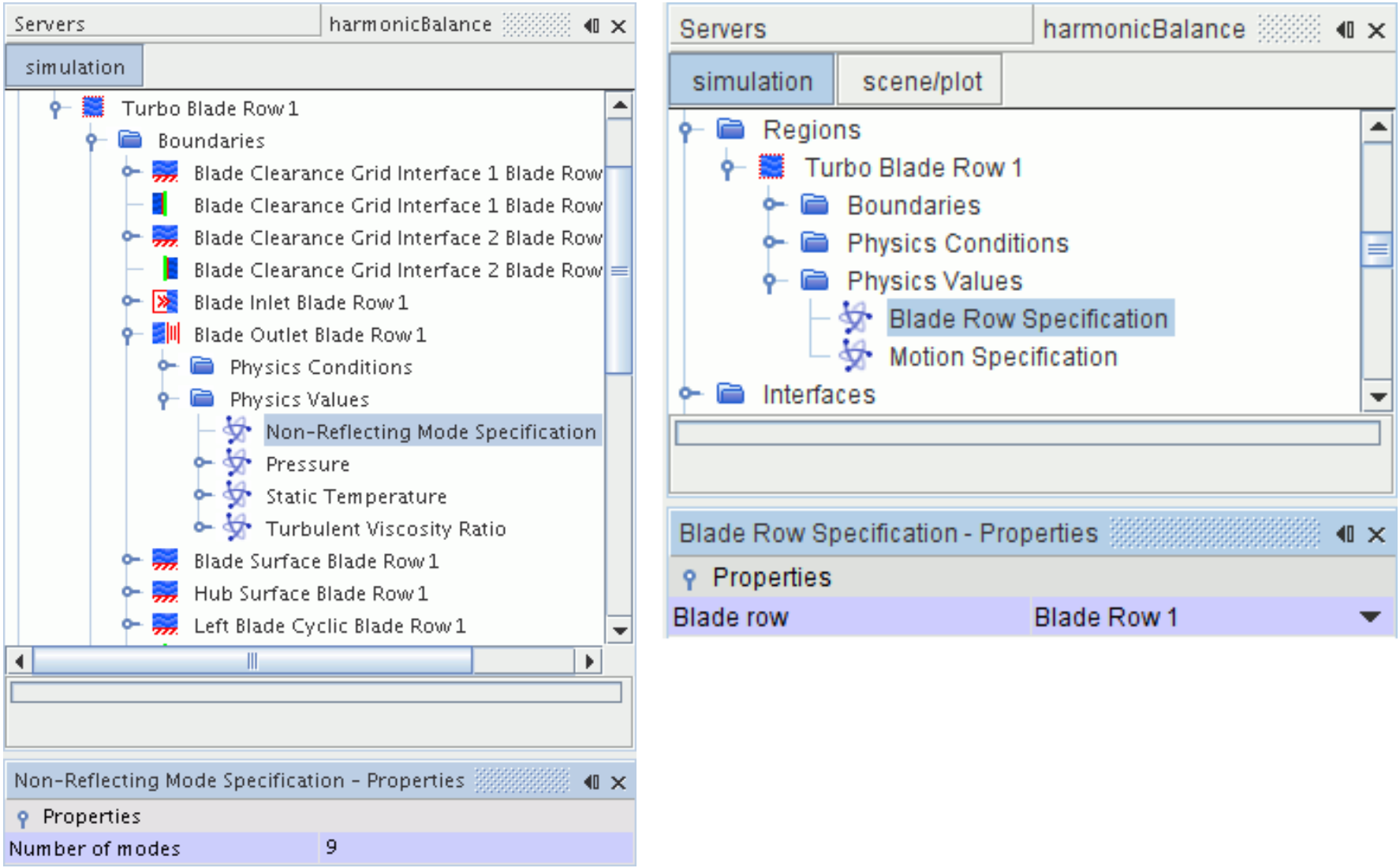

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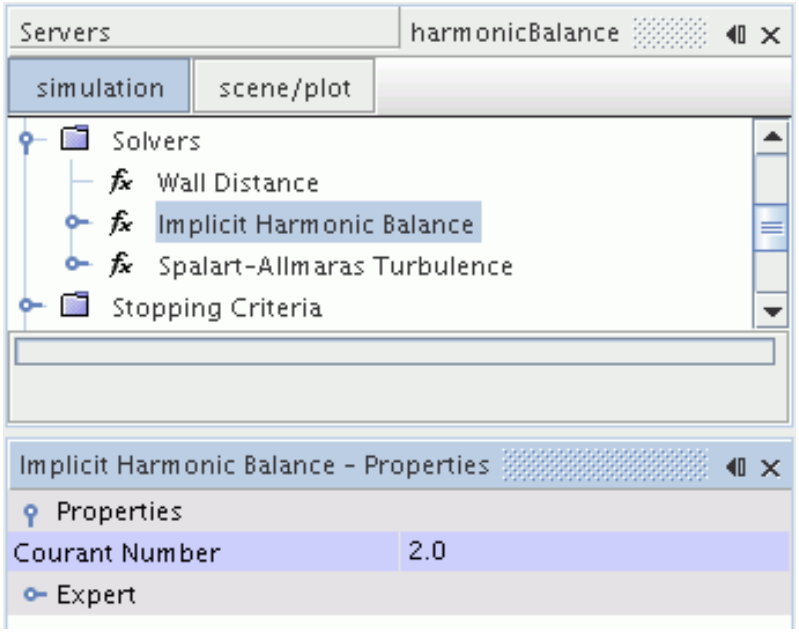

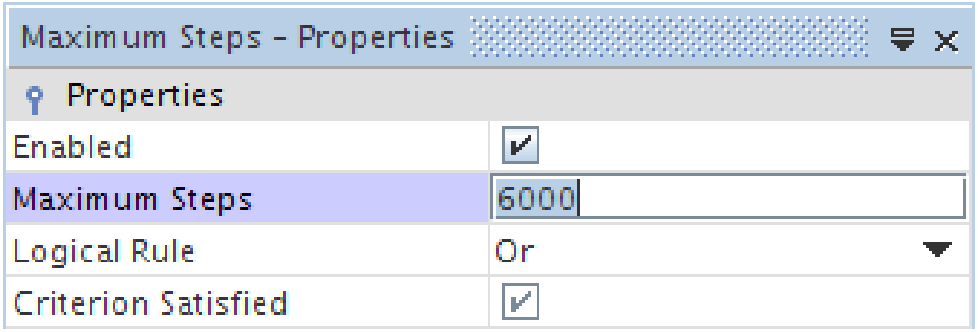

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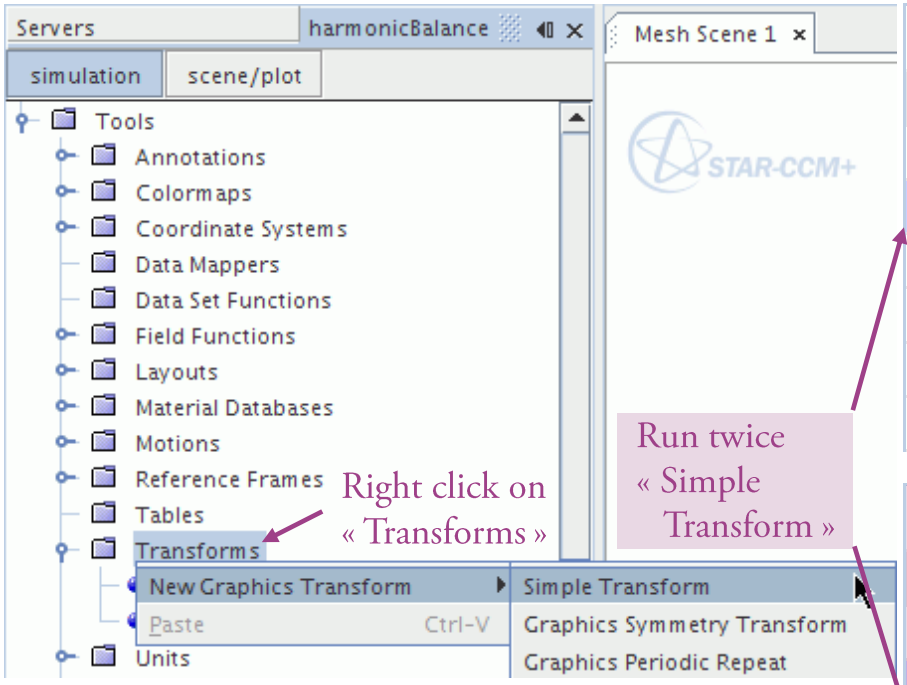


Simple Transform Down - Properties

Properties

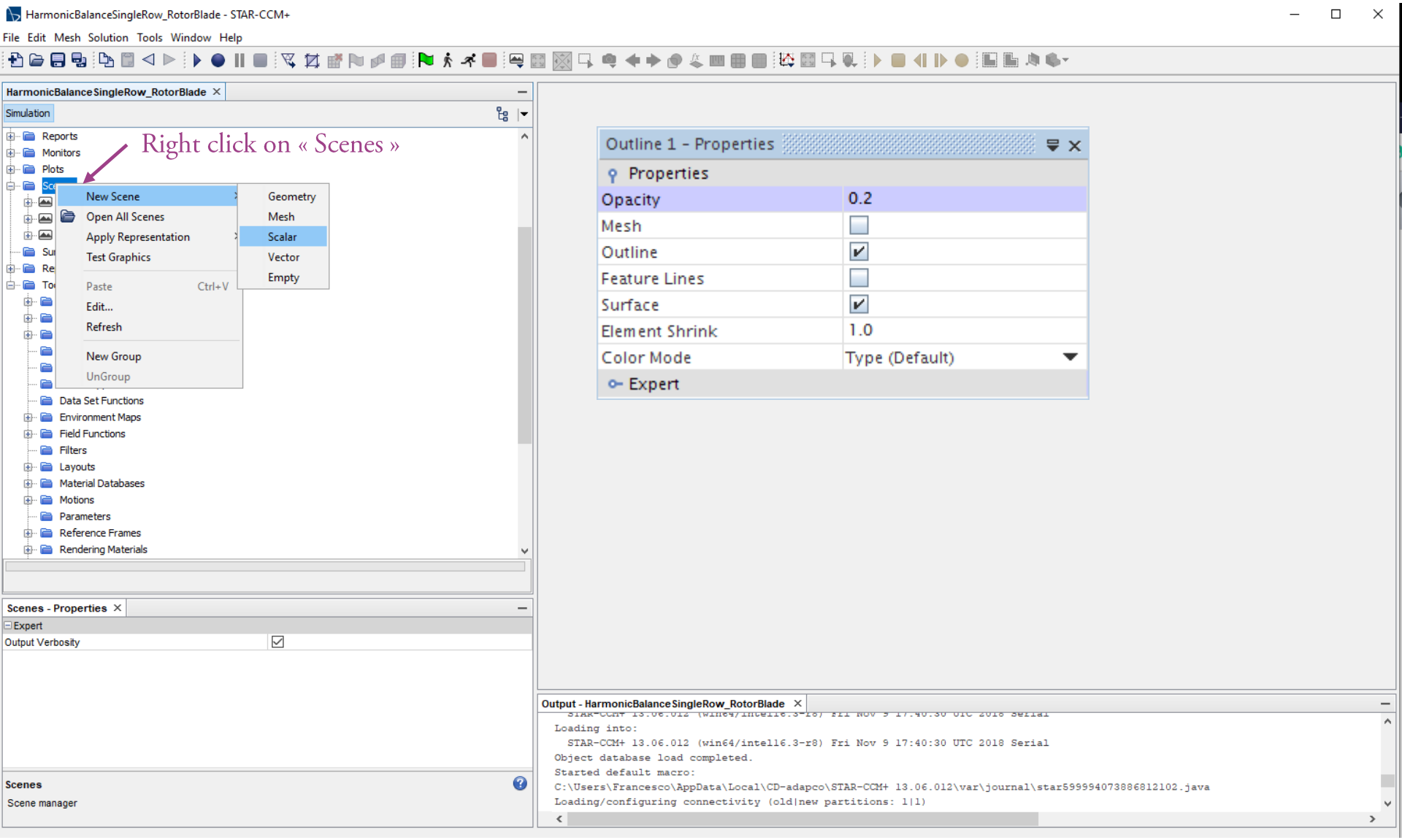
Coordinate System	Laboratory
Rotation Angle	-10.0 deg
Rotation Origin	[0.0, 0.0, 0.0] m,m,m
Rotation Axis	[0.0, 0.0, 1.0] m,m,m
Translation	[0.0, 0.0, 0.0] m,m,m
Scale	[1.0, 1.0, 1.0]

Simple Transform Up - Properties

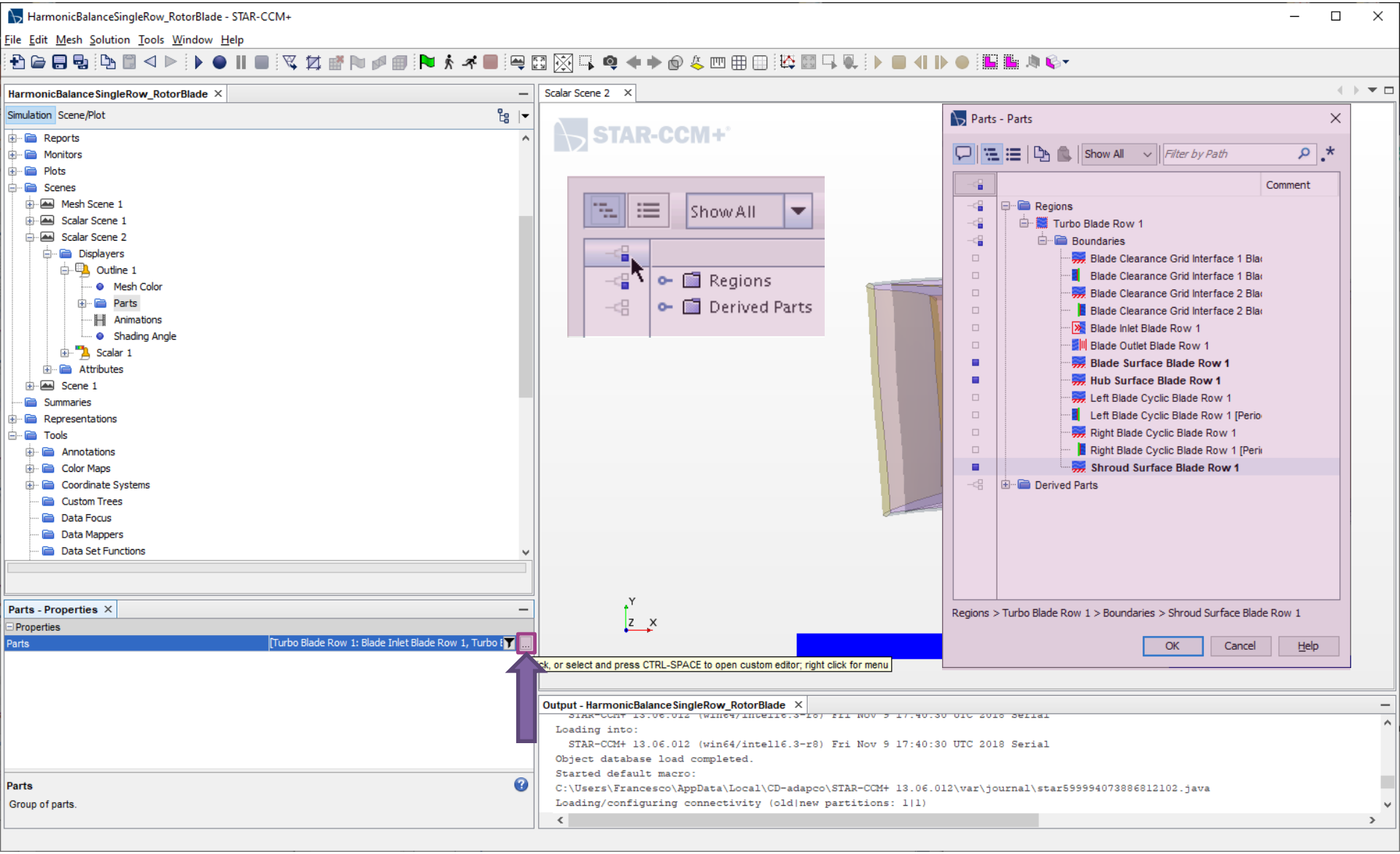
Properties

Coordinate System	Laboratory
Rotation Angle	10.0 deg
Rotation Origin	[0.0, 0.0, 0.0] m,m,m
Rotation Axis	[0.0, 0.0, 1.0] m,m,m
Translation	[0.0, 0.0, 0.0] m,m,m
Scale	[1.0, 1.0, 1.0]

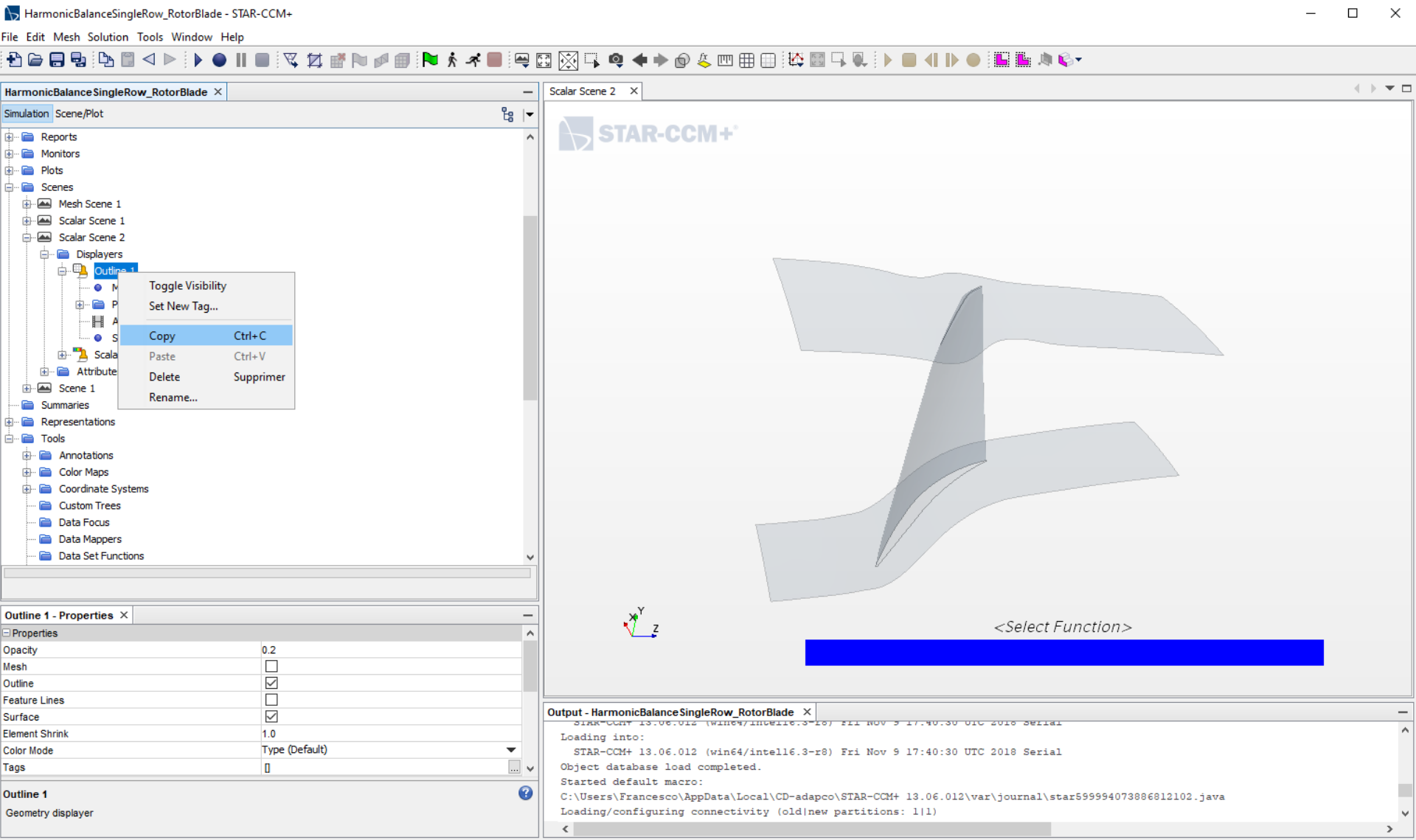
Harmonic Balance for Rotor Blade in StarCCM+



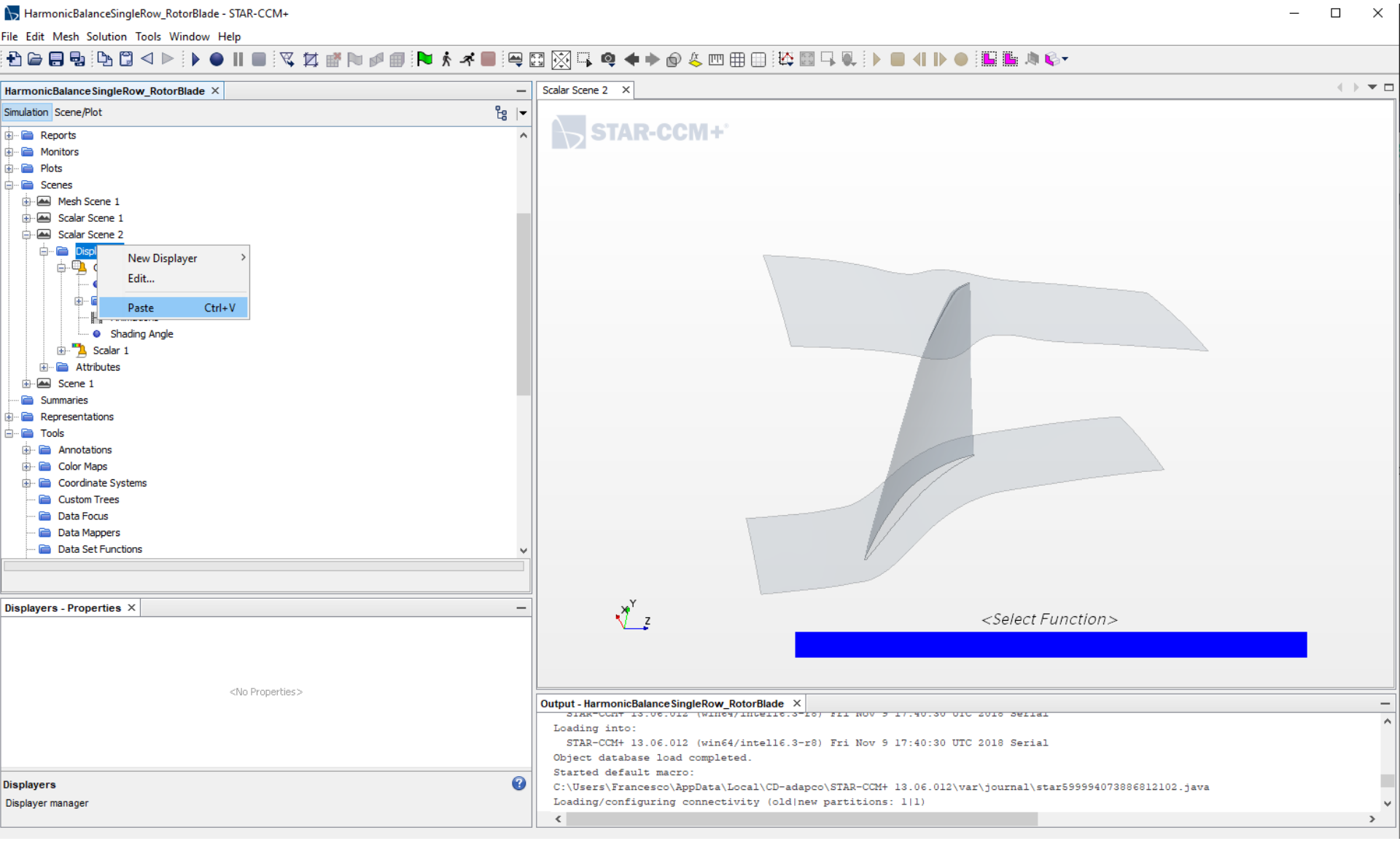
Harmonic Balance for Rotor Blade in StarCCM+



Harmonic Balance for Rotor Blade in StarCCM+

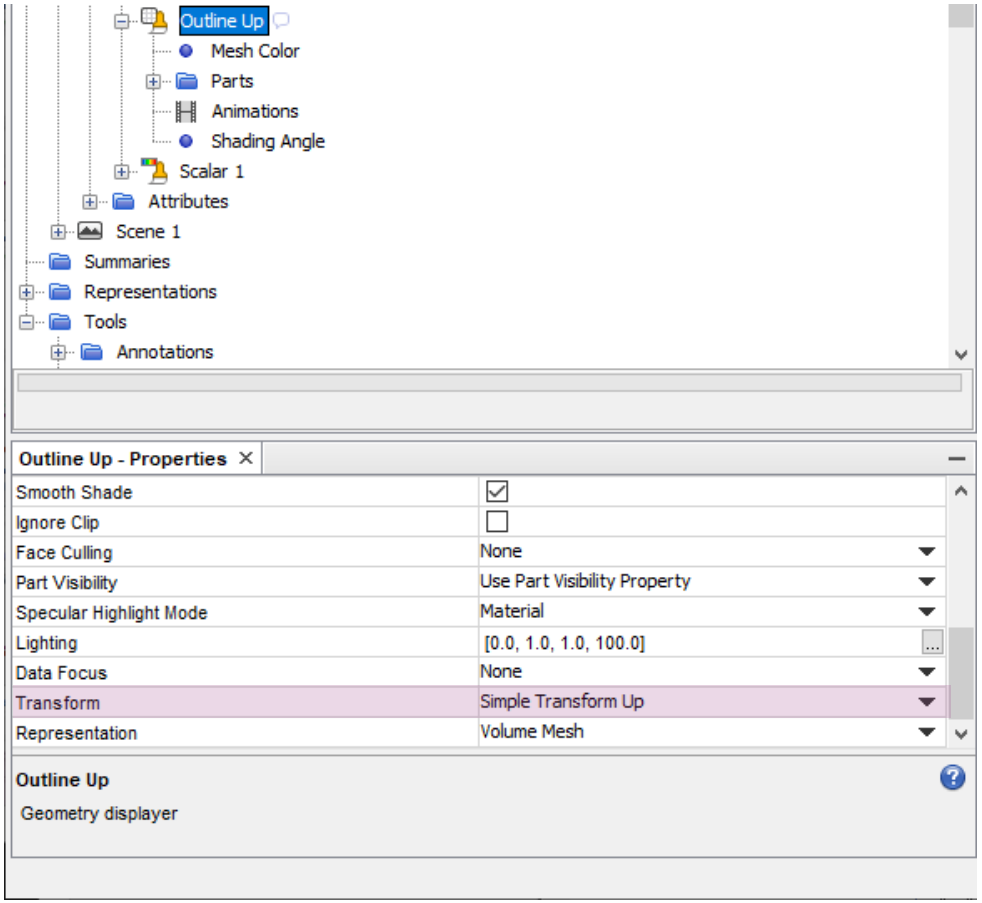


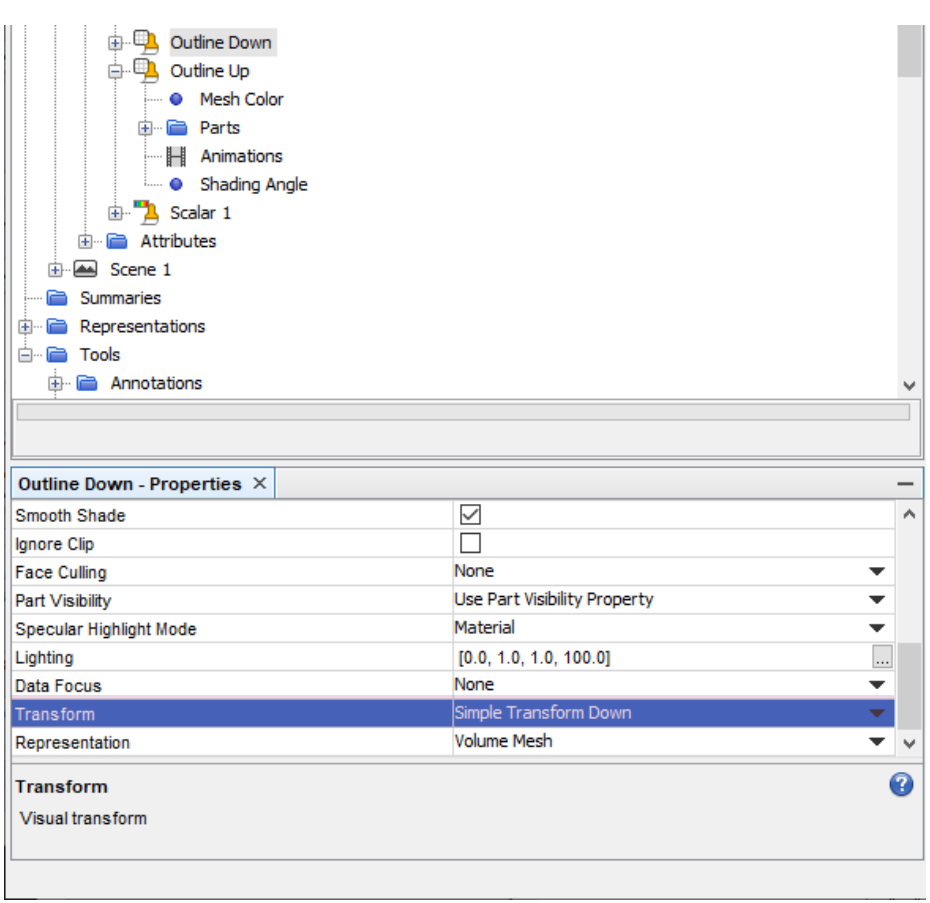
Harmonic Balance for Rotor Blade in StarCCM+



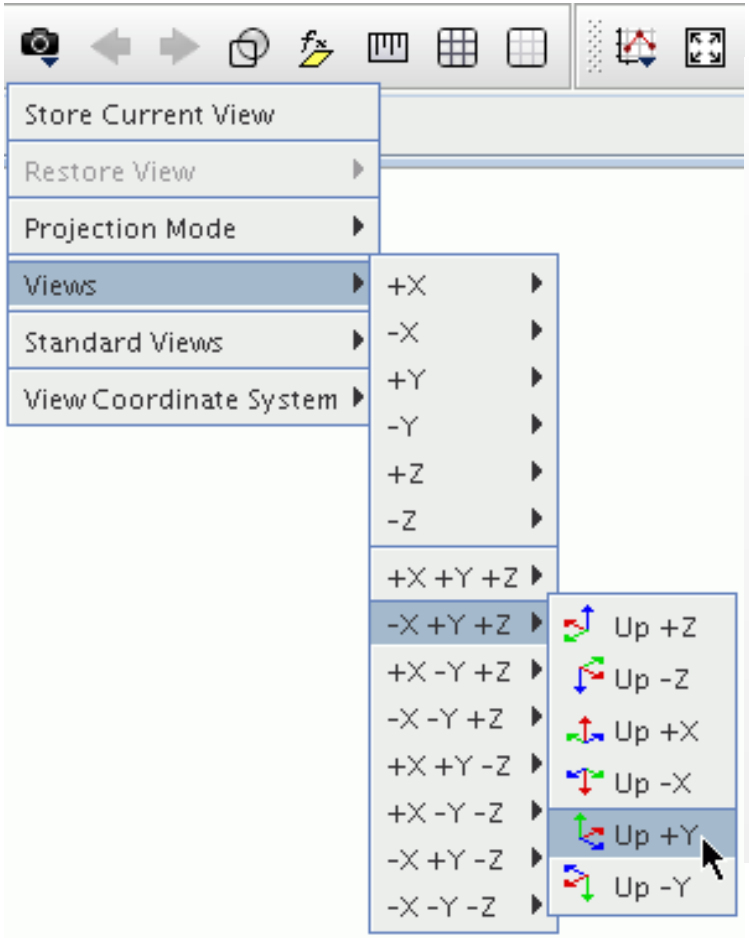
Repeat the copy-paste operation twice such to have 3 outlines

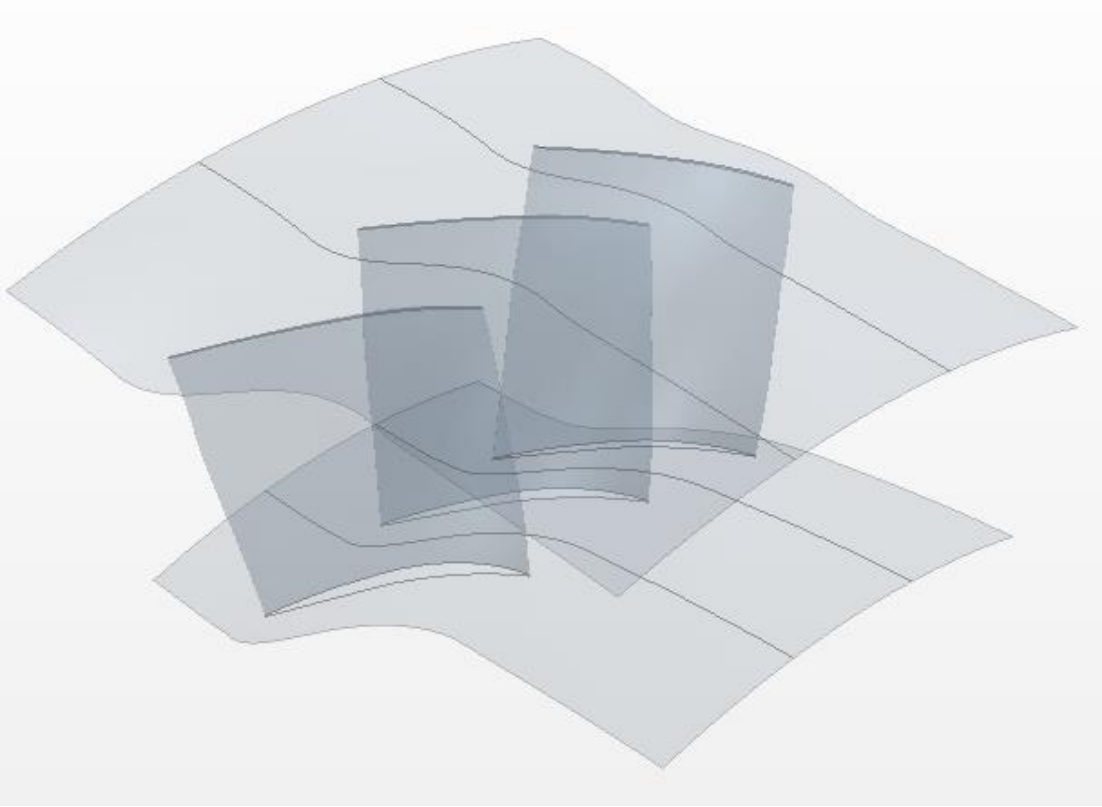
Harmonic Balance for Rotor Blade in StarCCM+





Harmonic Balance for Rotor Blade in StarCCM+





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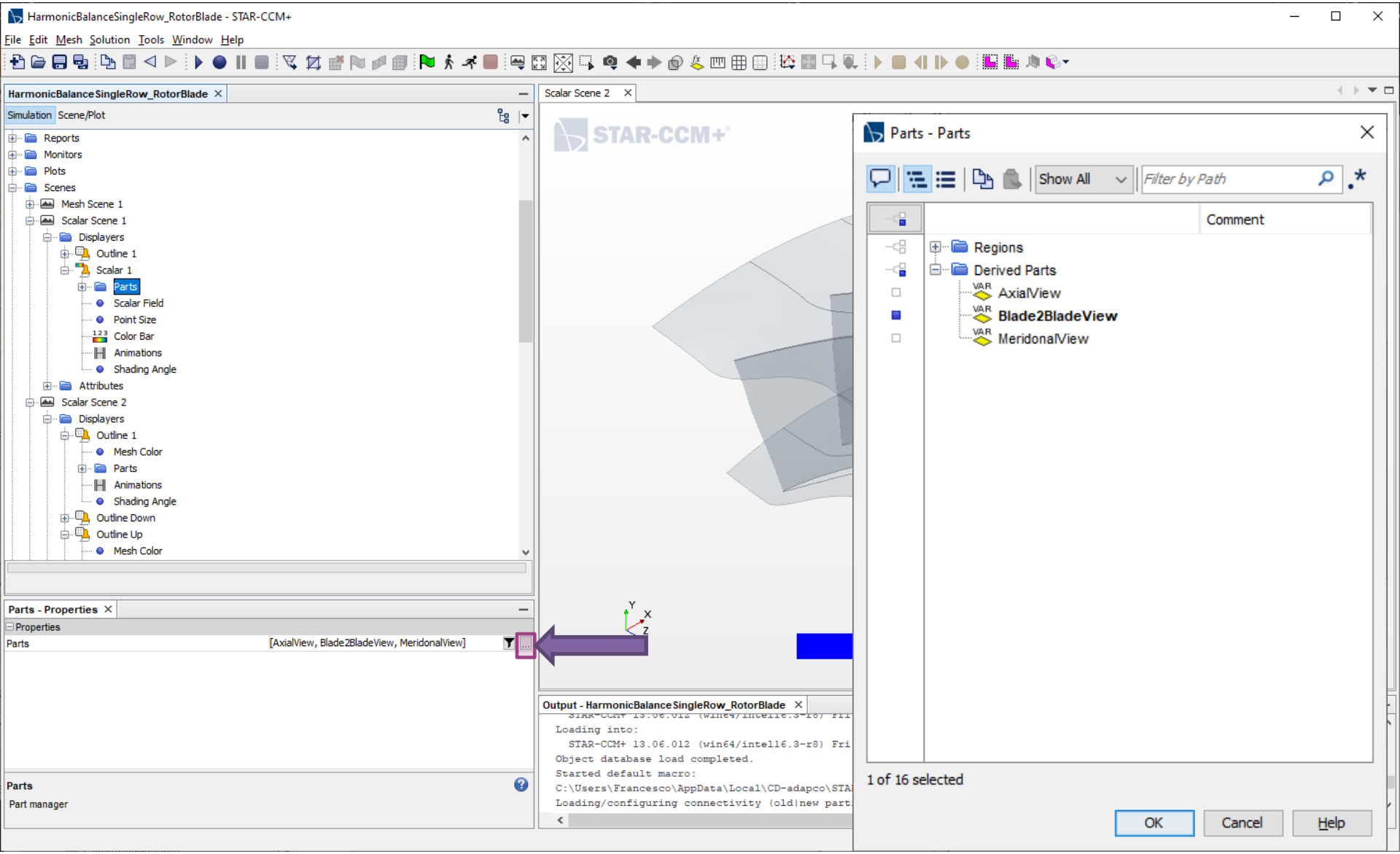

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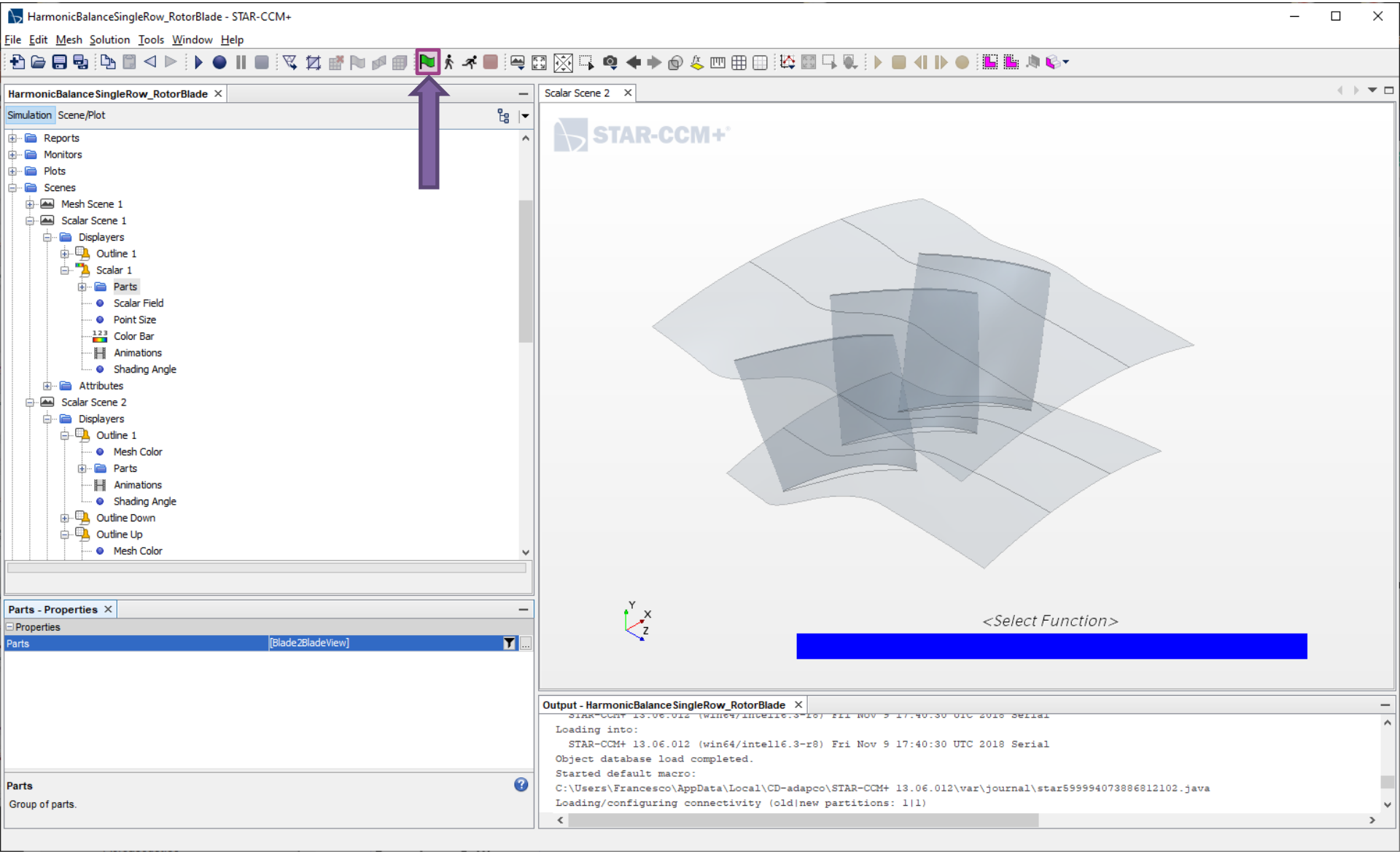
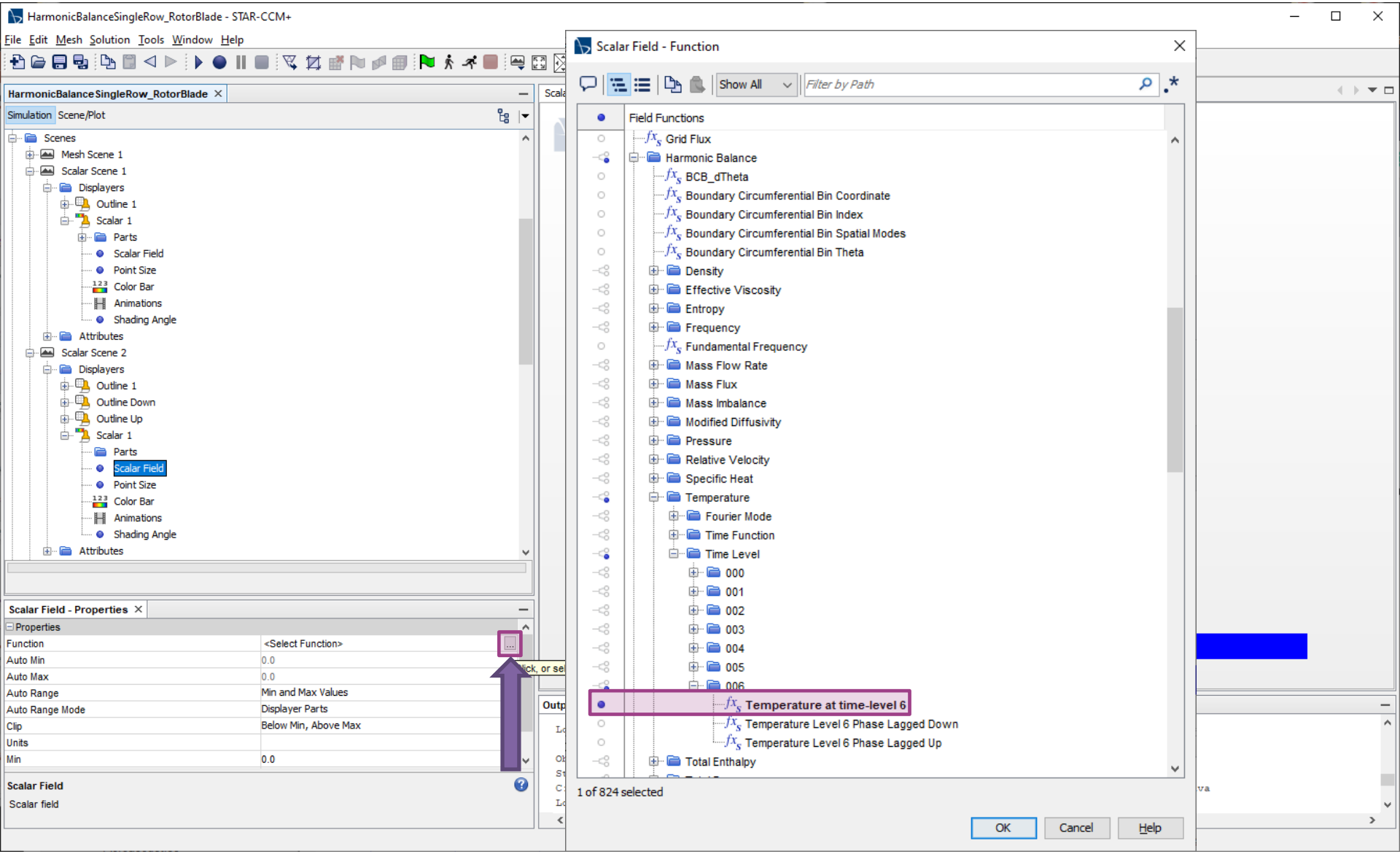


Harmonic Balance for Rotor Blade in StarCCM+



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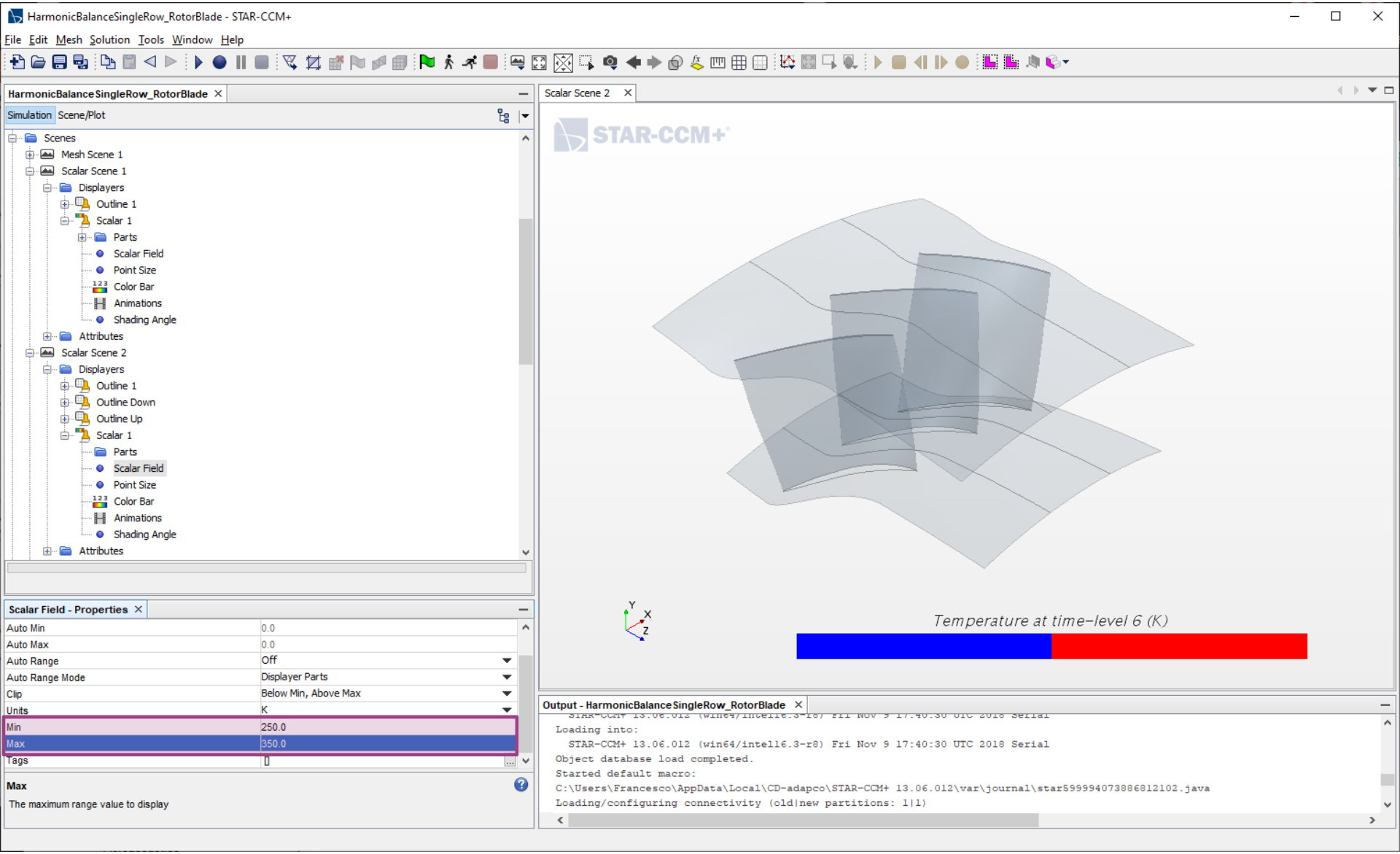
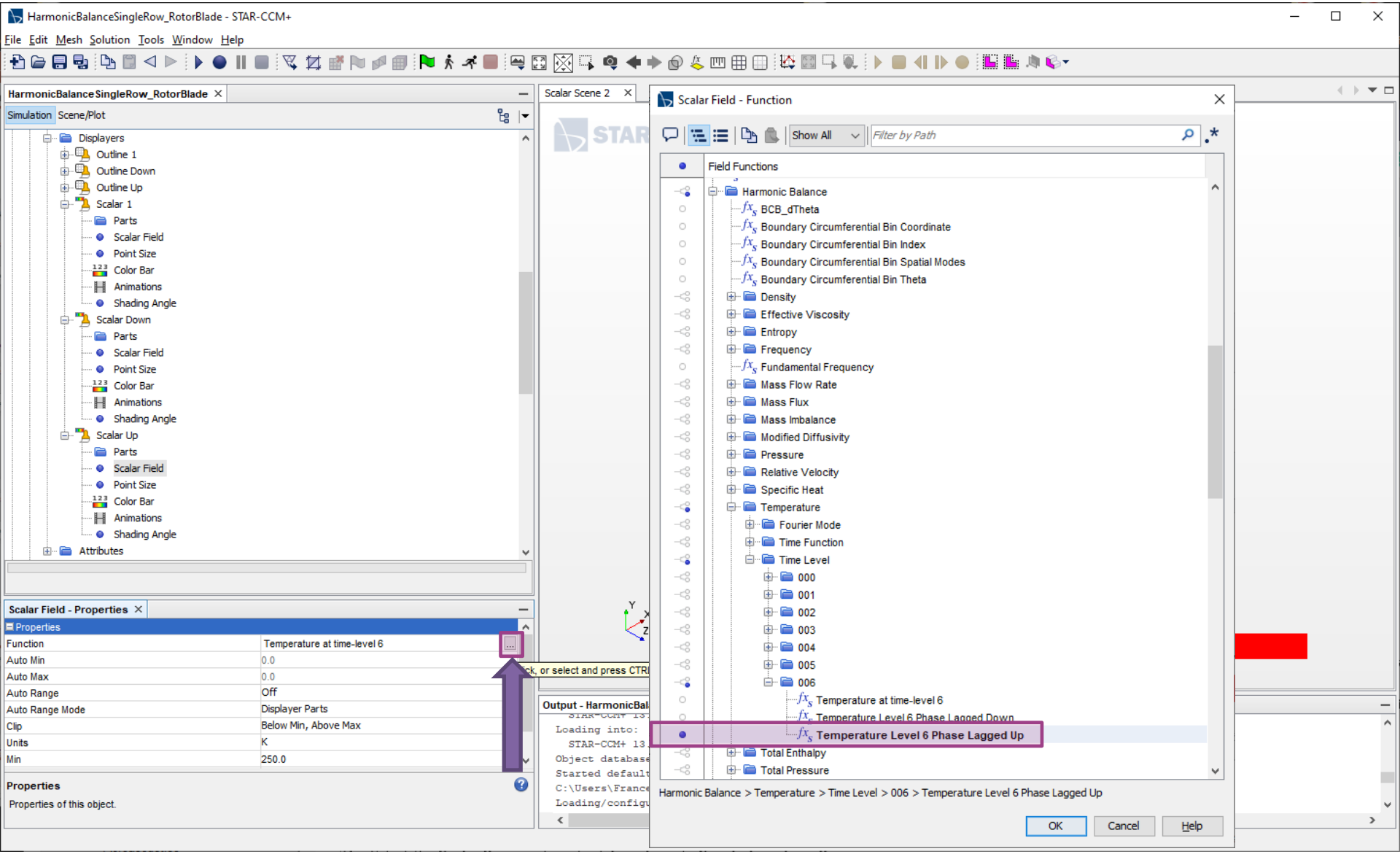


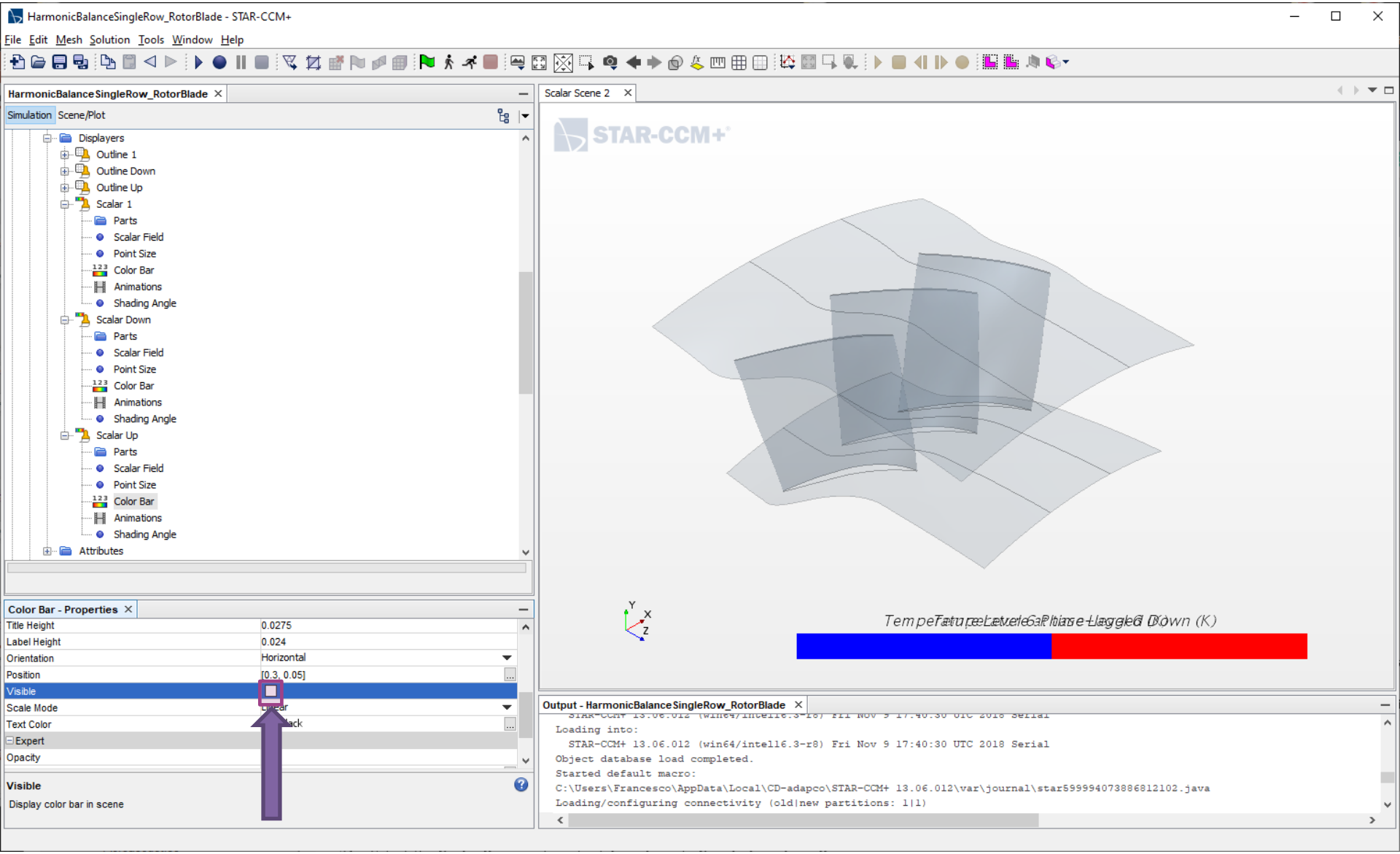
Copy-paste « Scalar 1 » twice as done for the Outline Diplayers

Harmonic Balance for Rotor Blade in StarCCM+



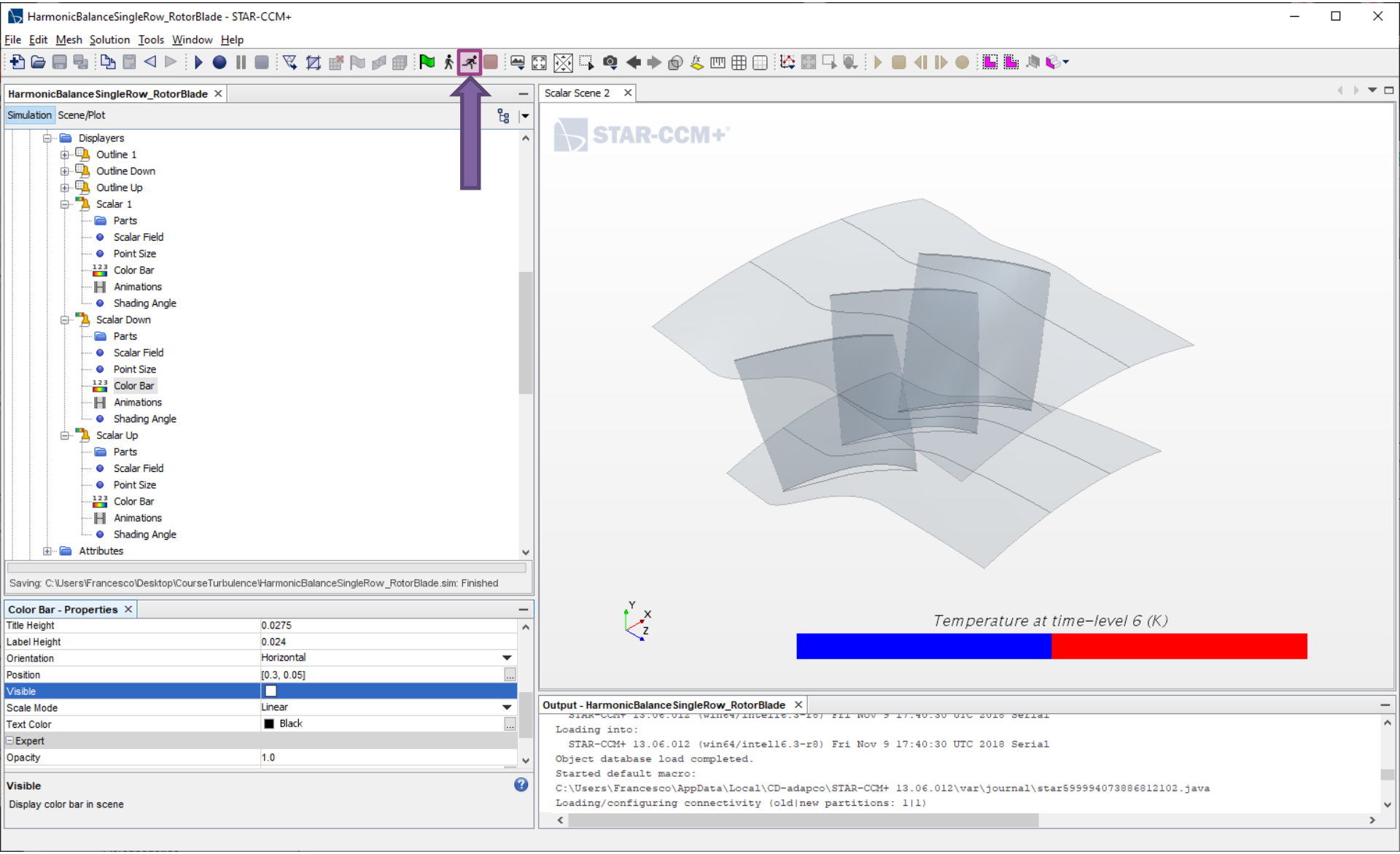
Change the Scalar Function of « Scalar Down » to « Temperature Level 6 Phase Lagged Down »

Harmonic Balance for Rotor Blade in StarCCM+



Deselect « Visible » for « Scalar Down » and « Scalar Up »

Harmonic Balance for Rotor Blade in StarCCM+



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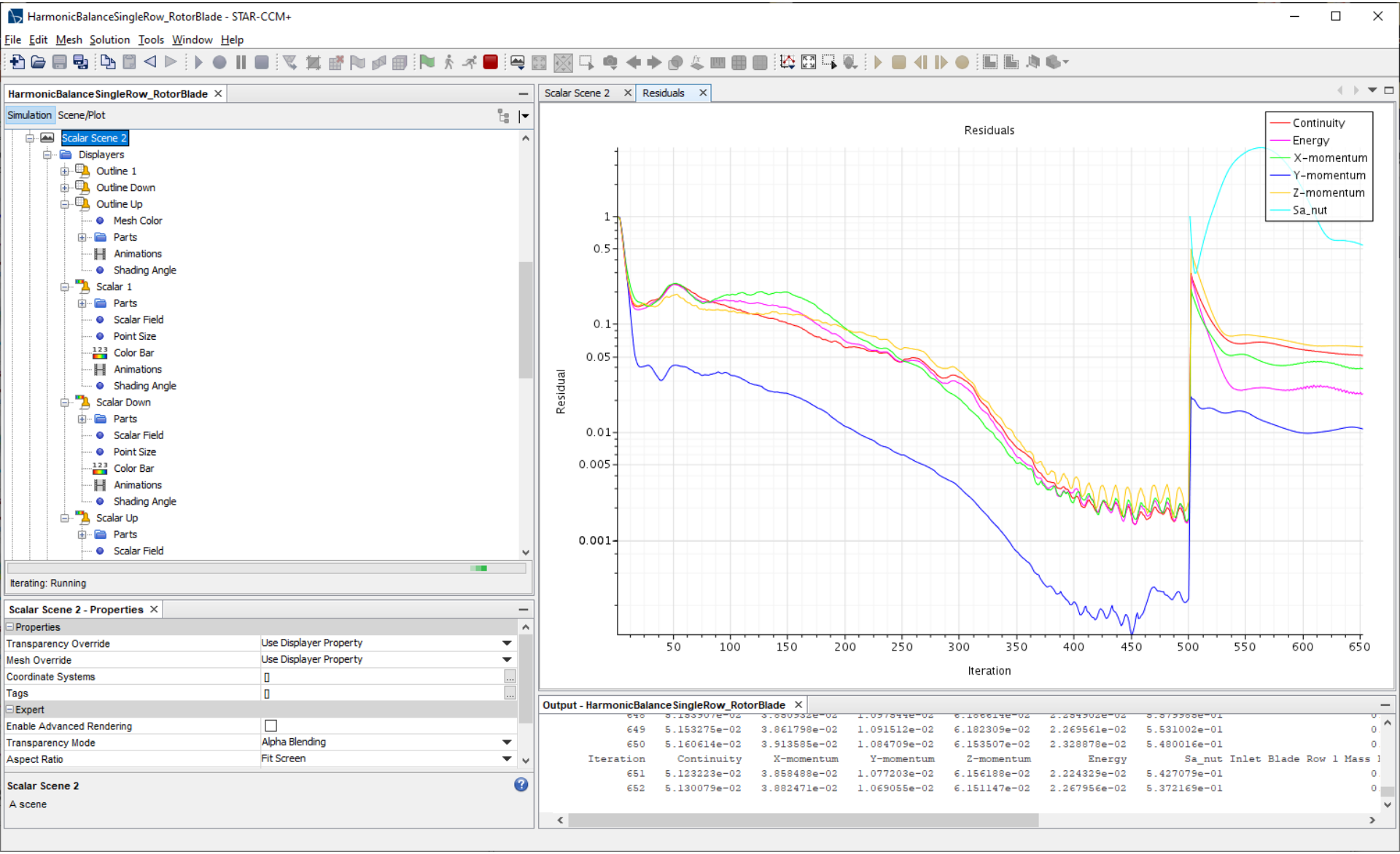

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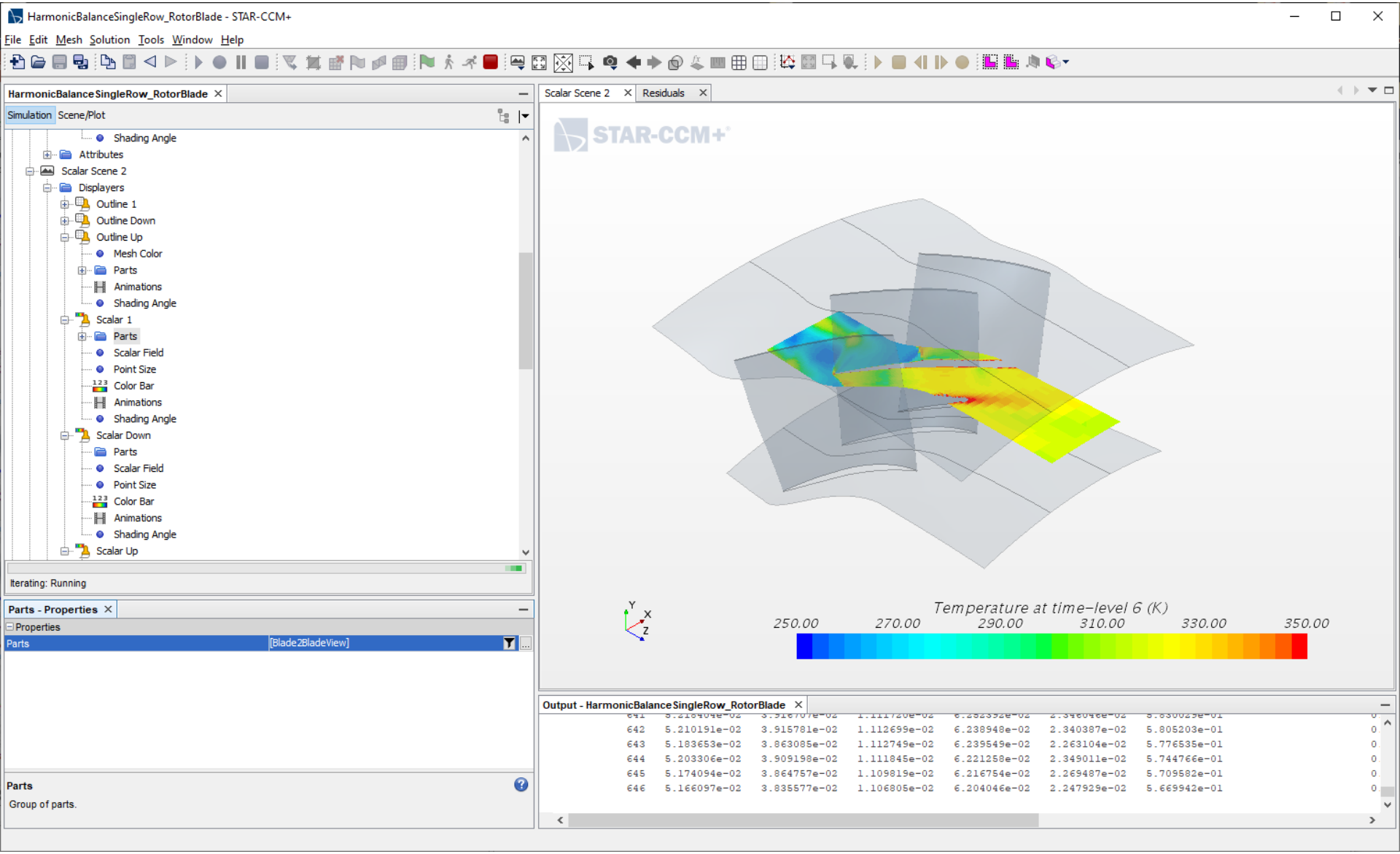

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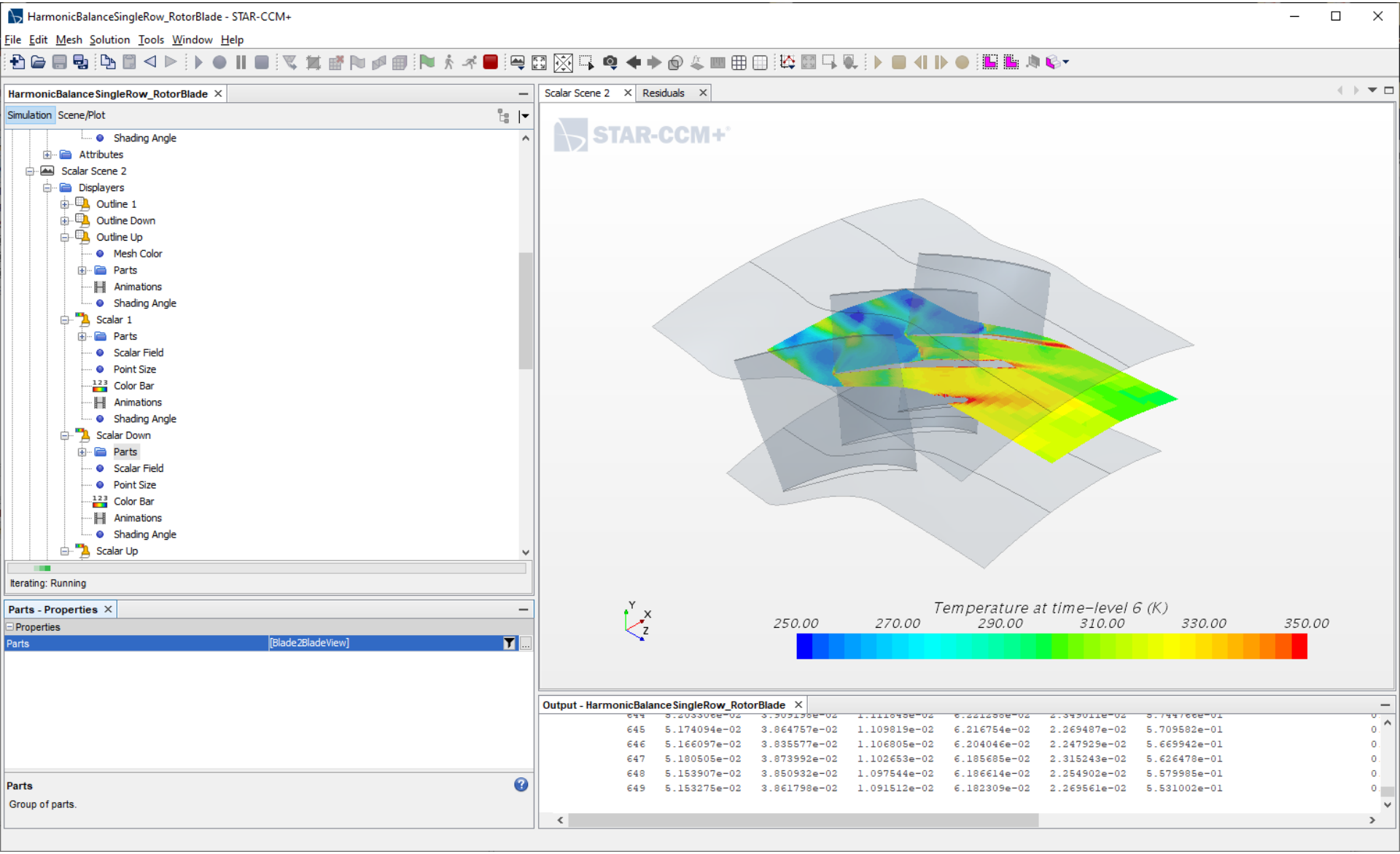

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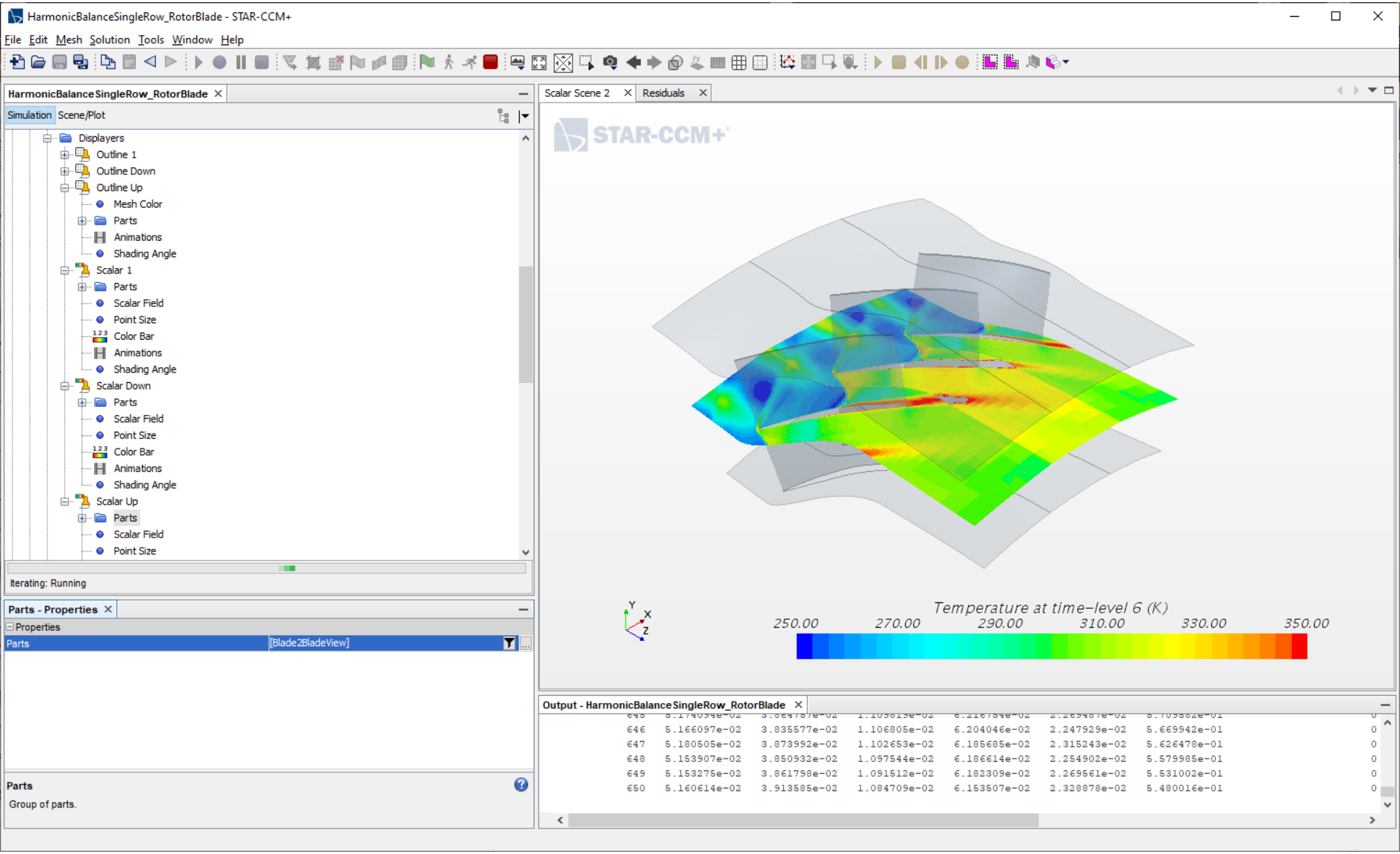

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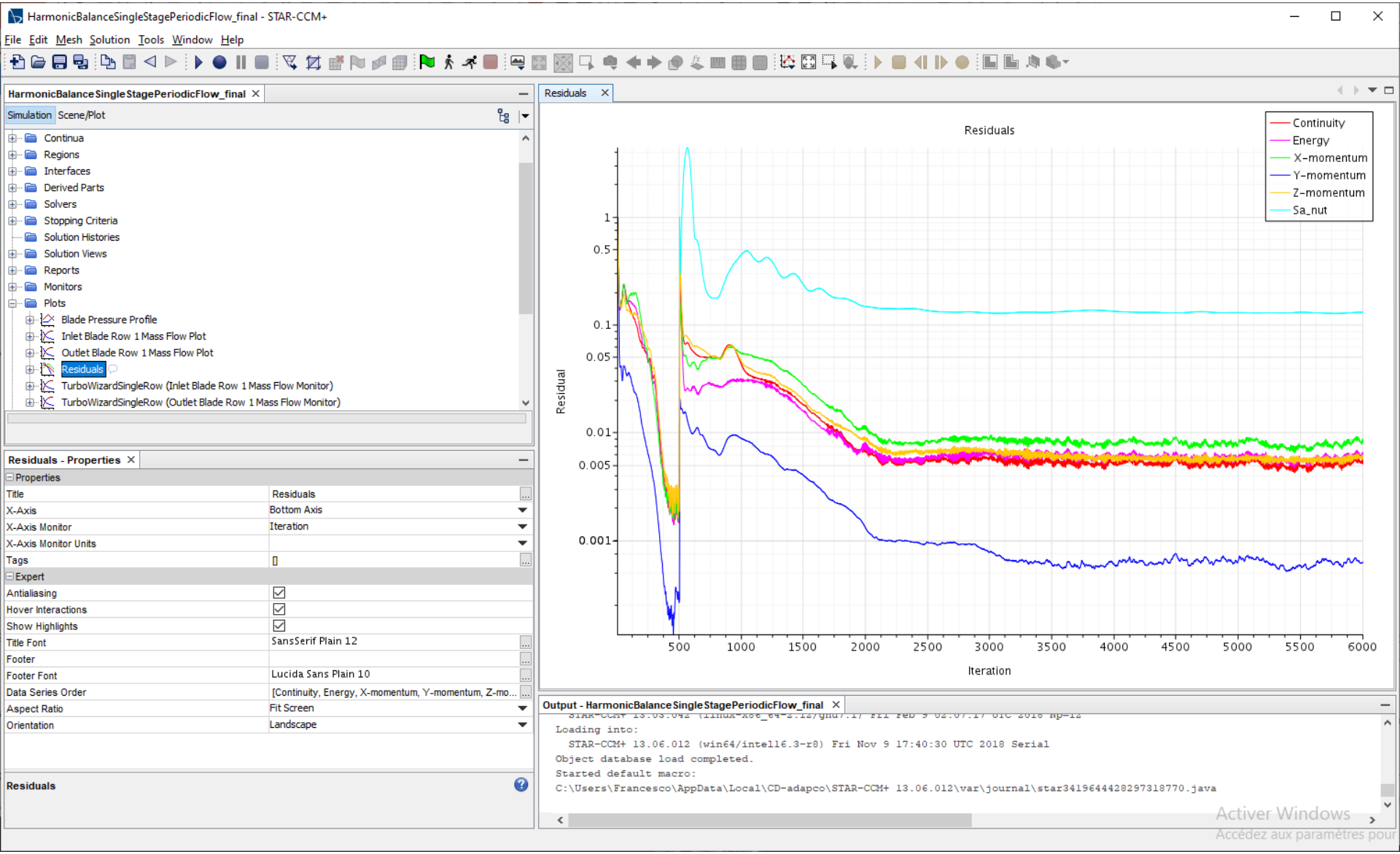

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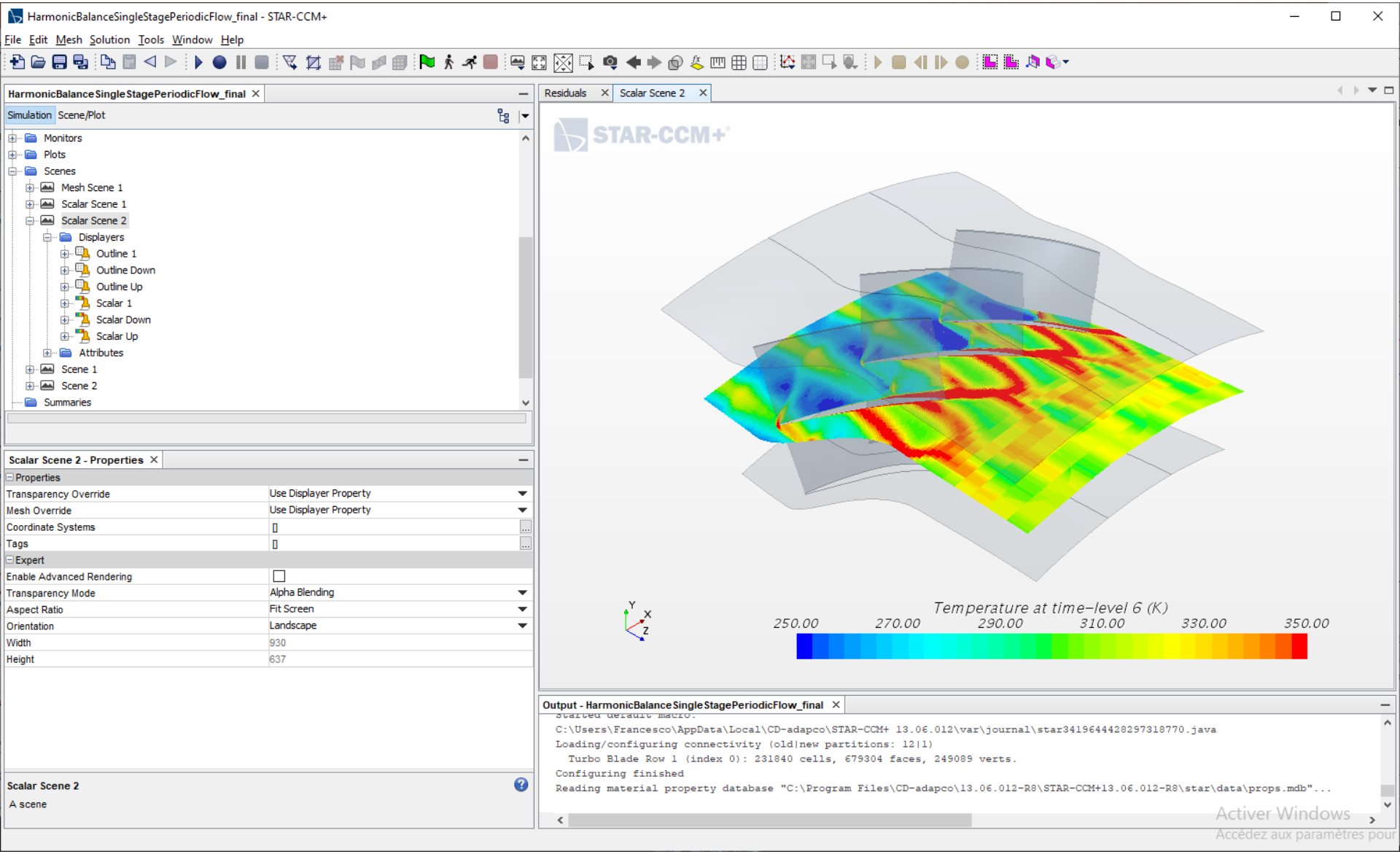

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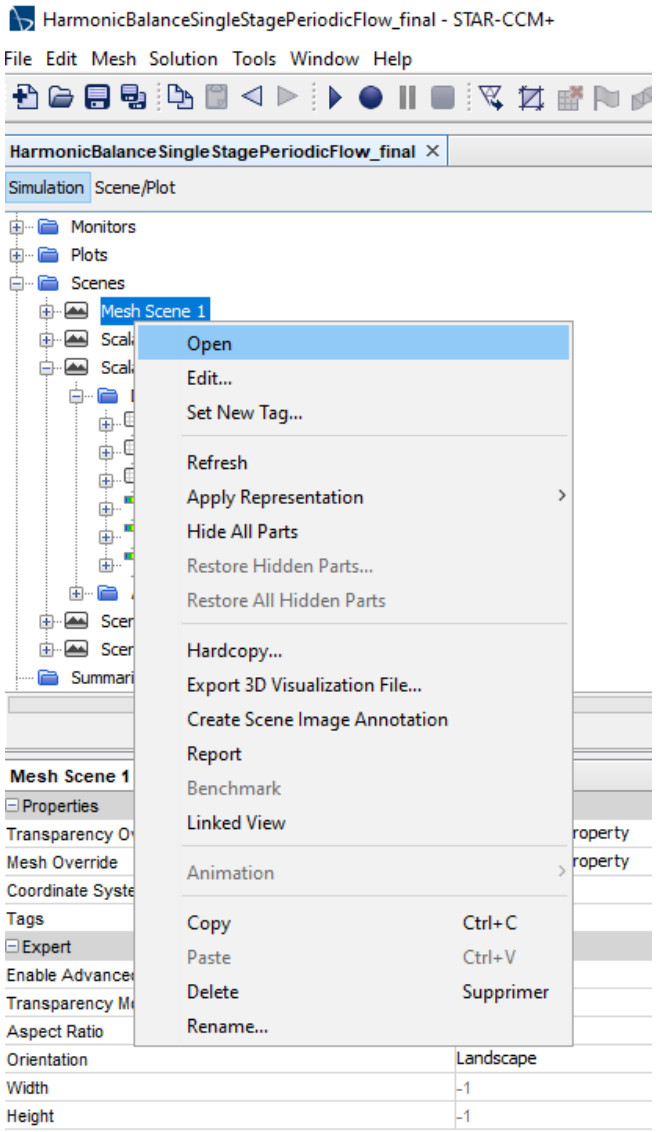

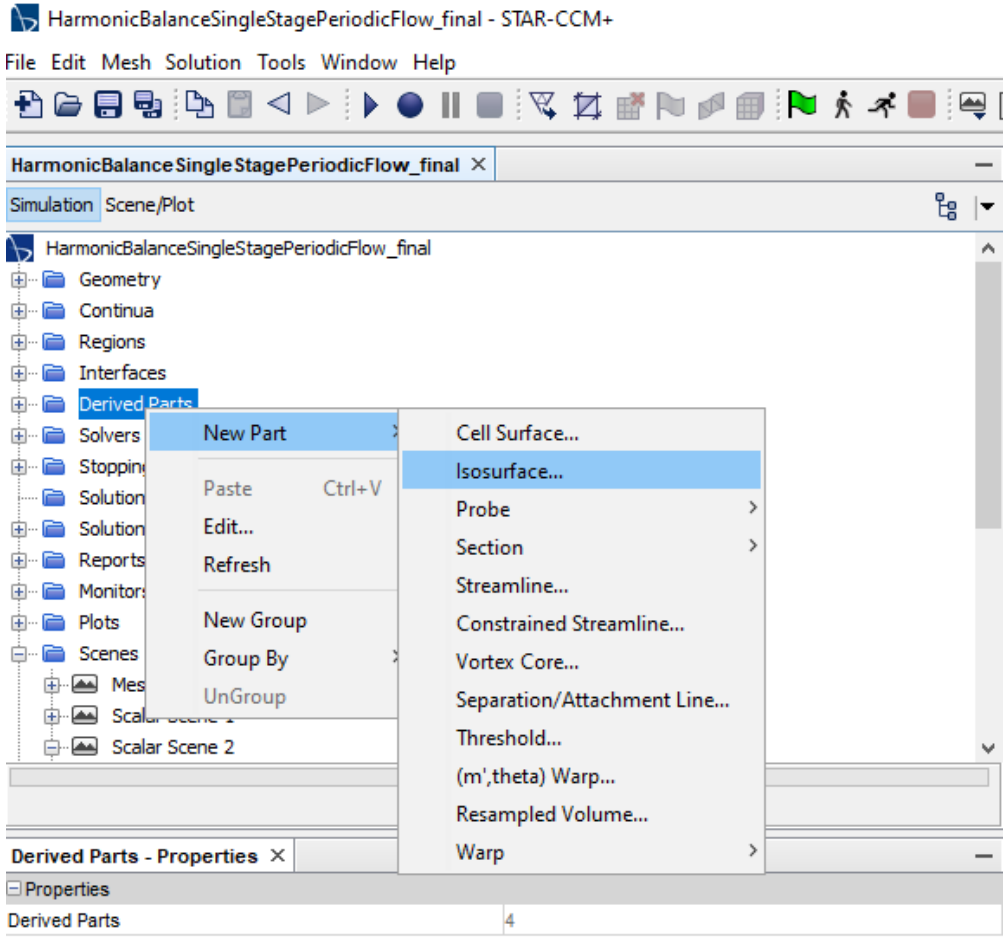

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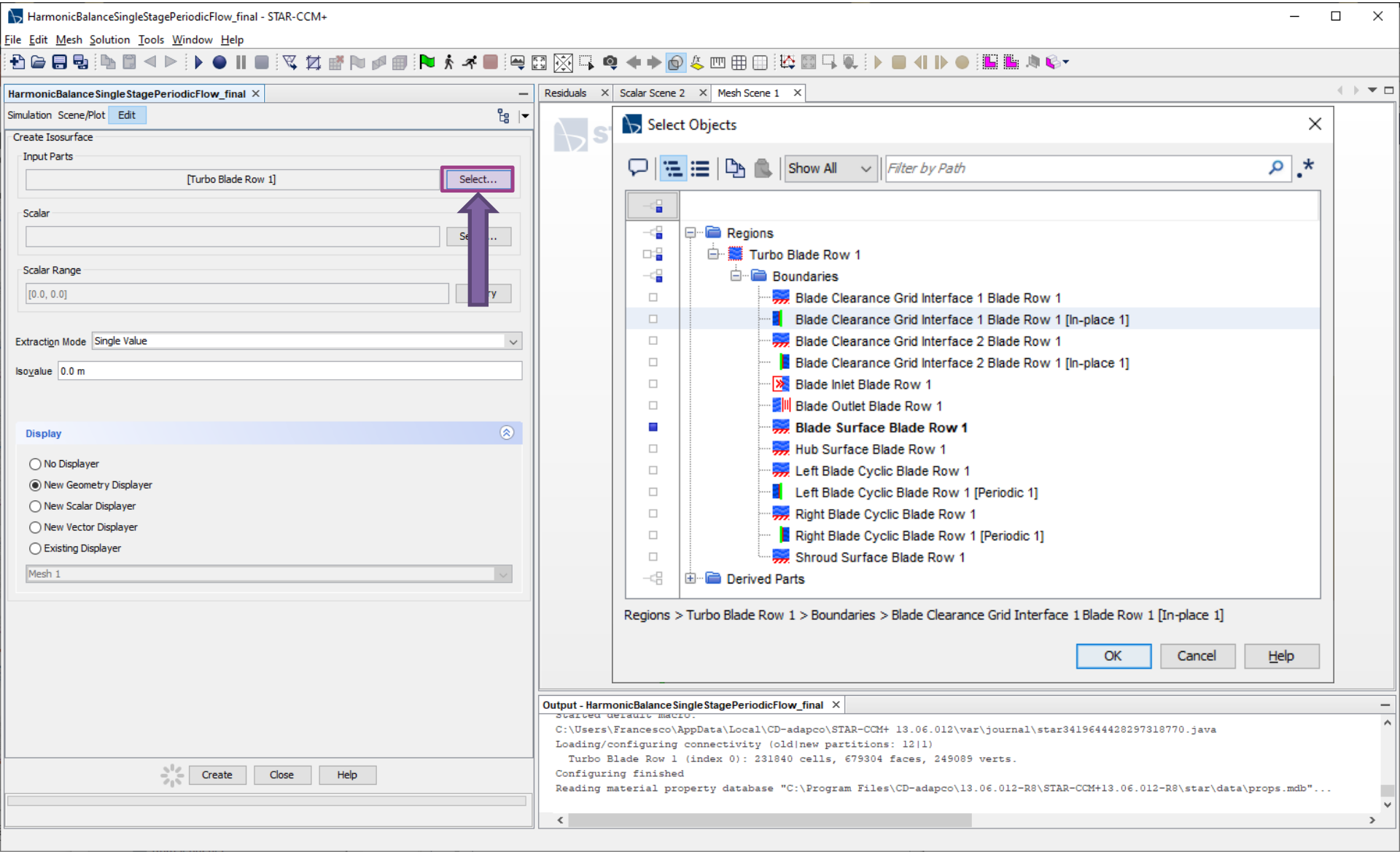

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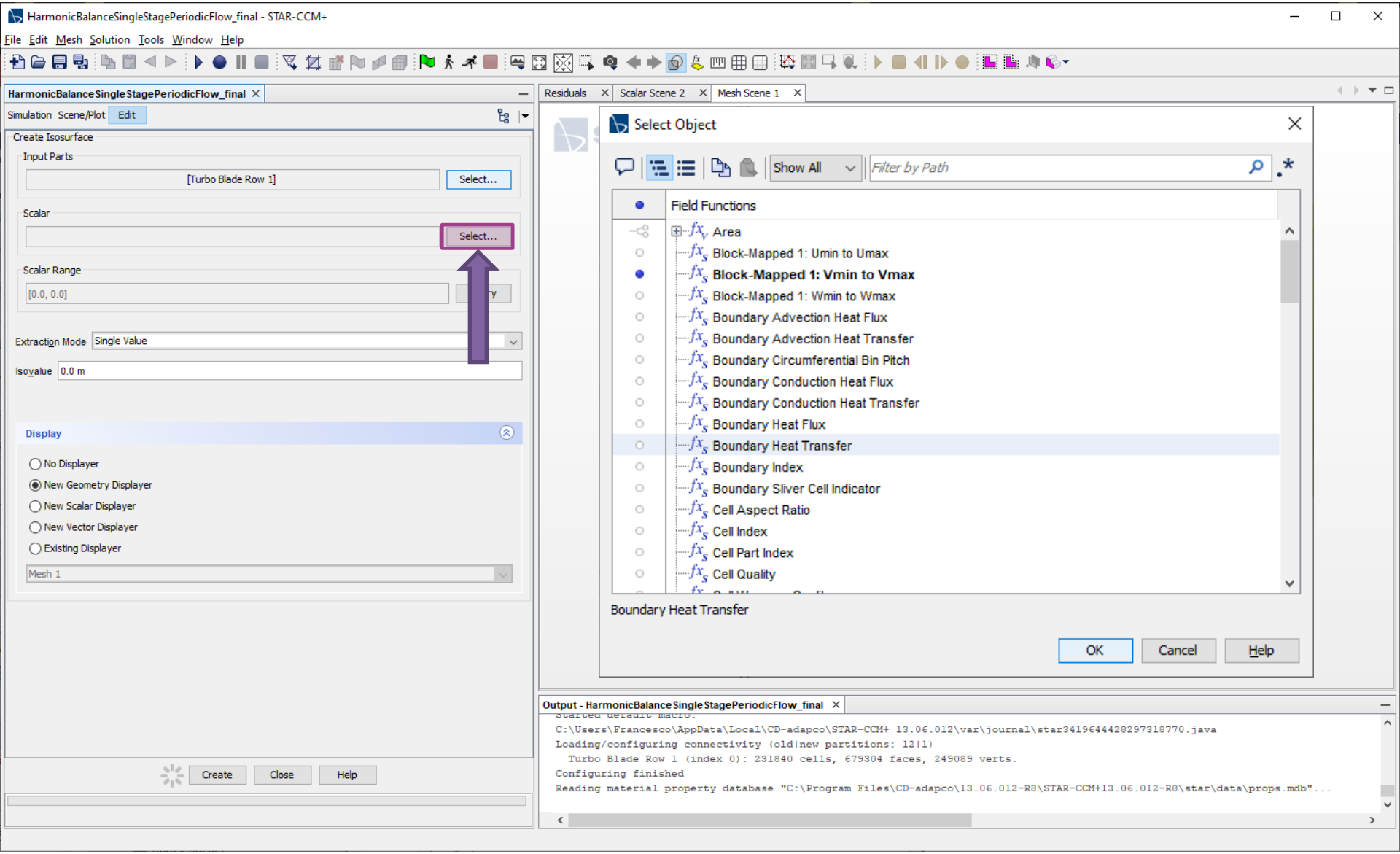

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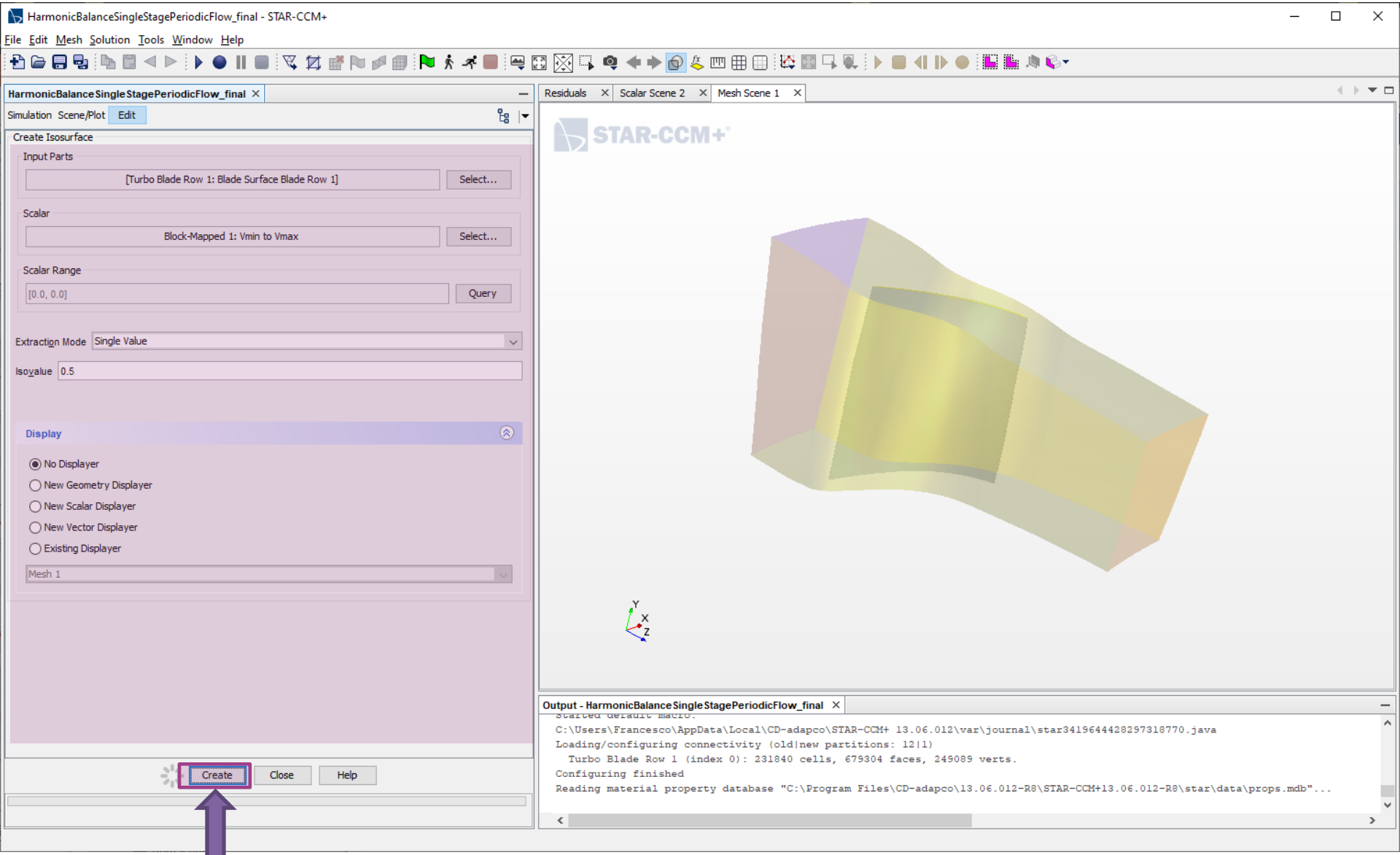

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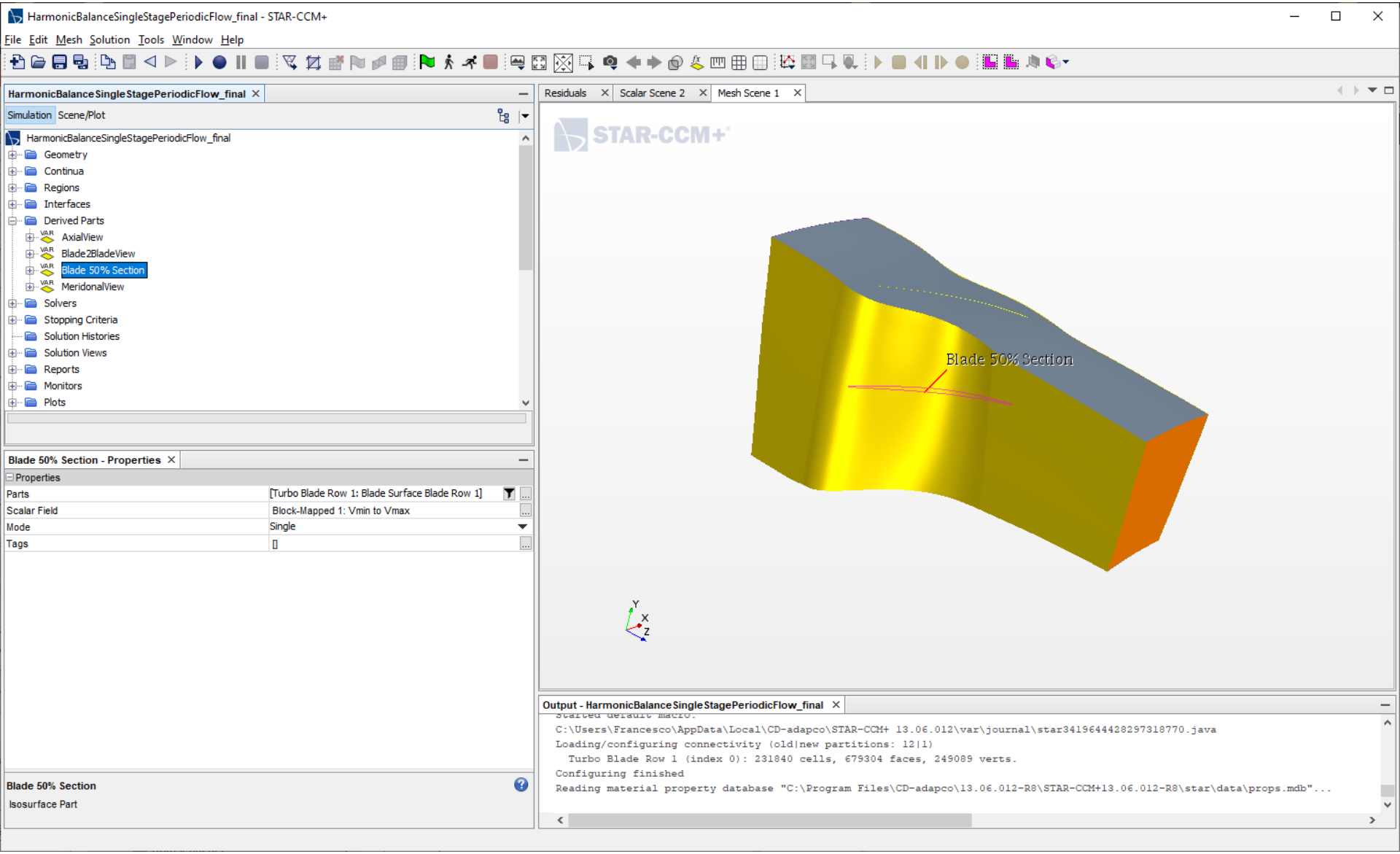

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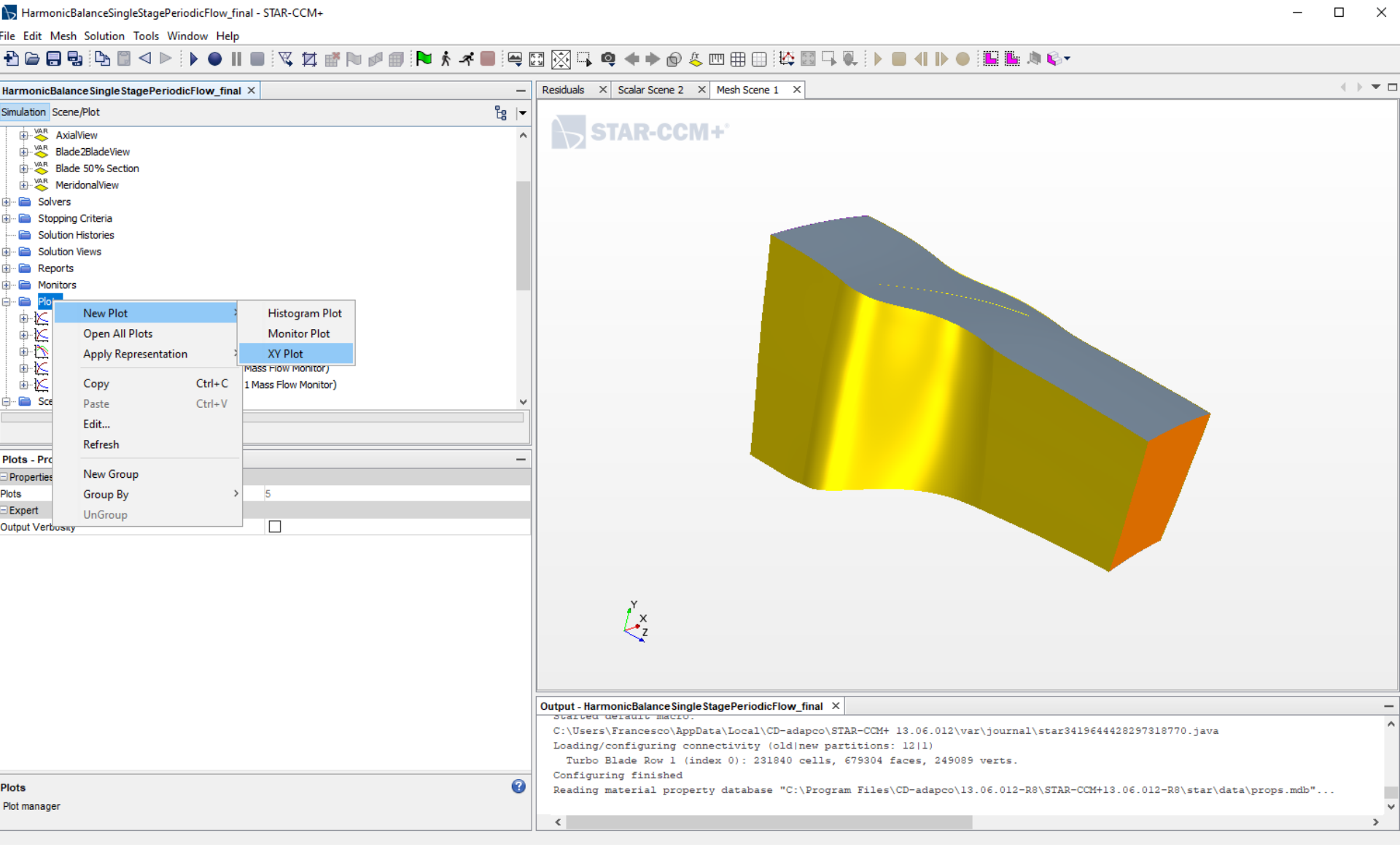

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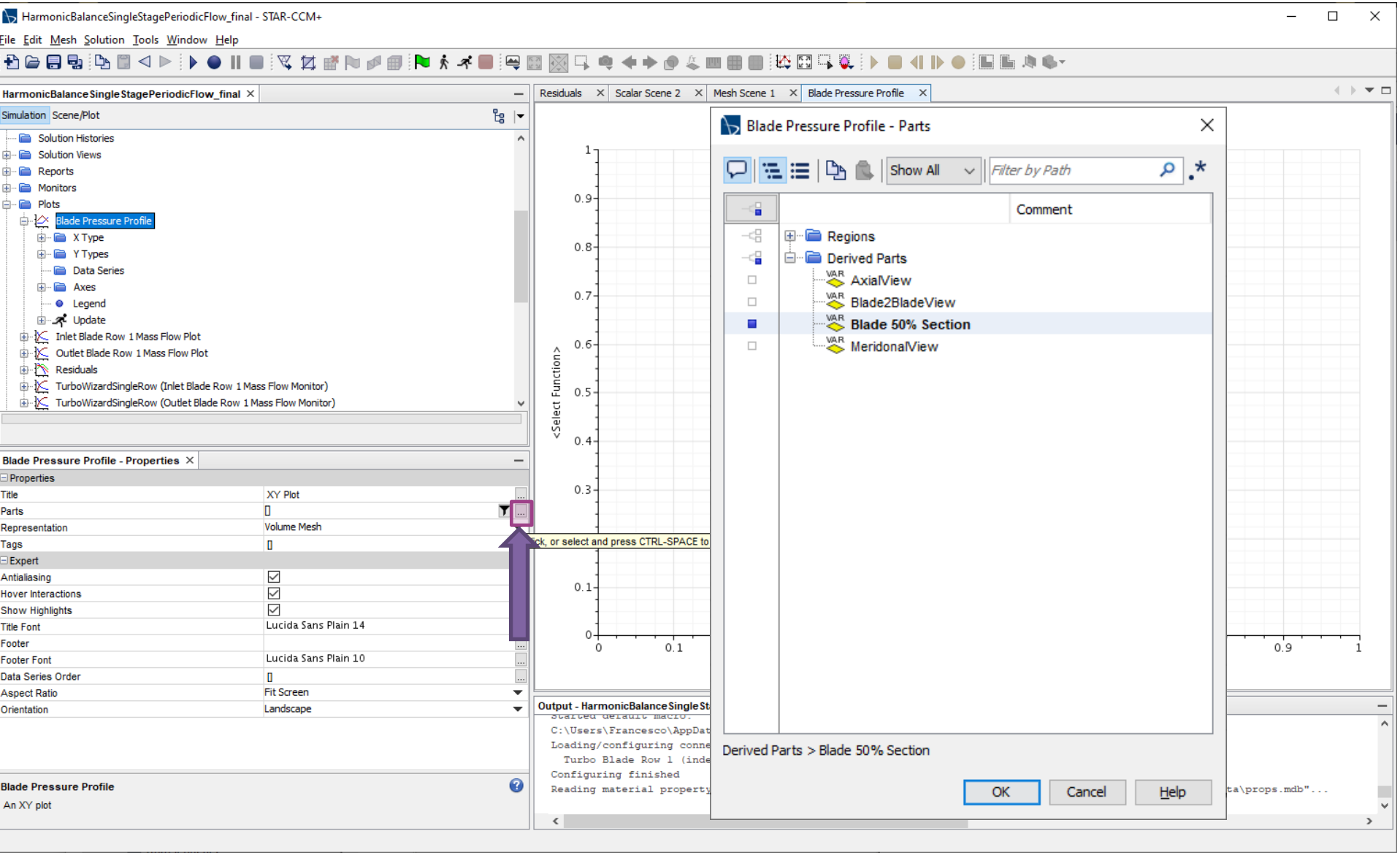

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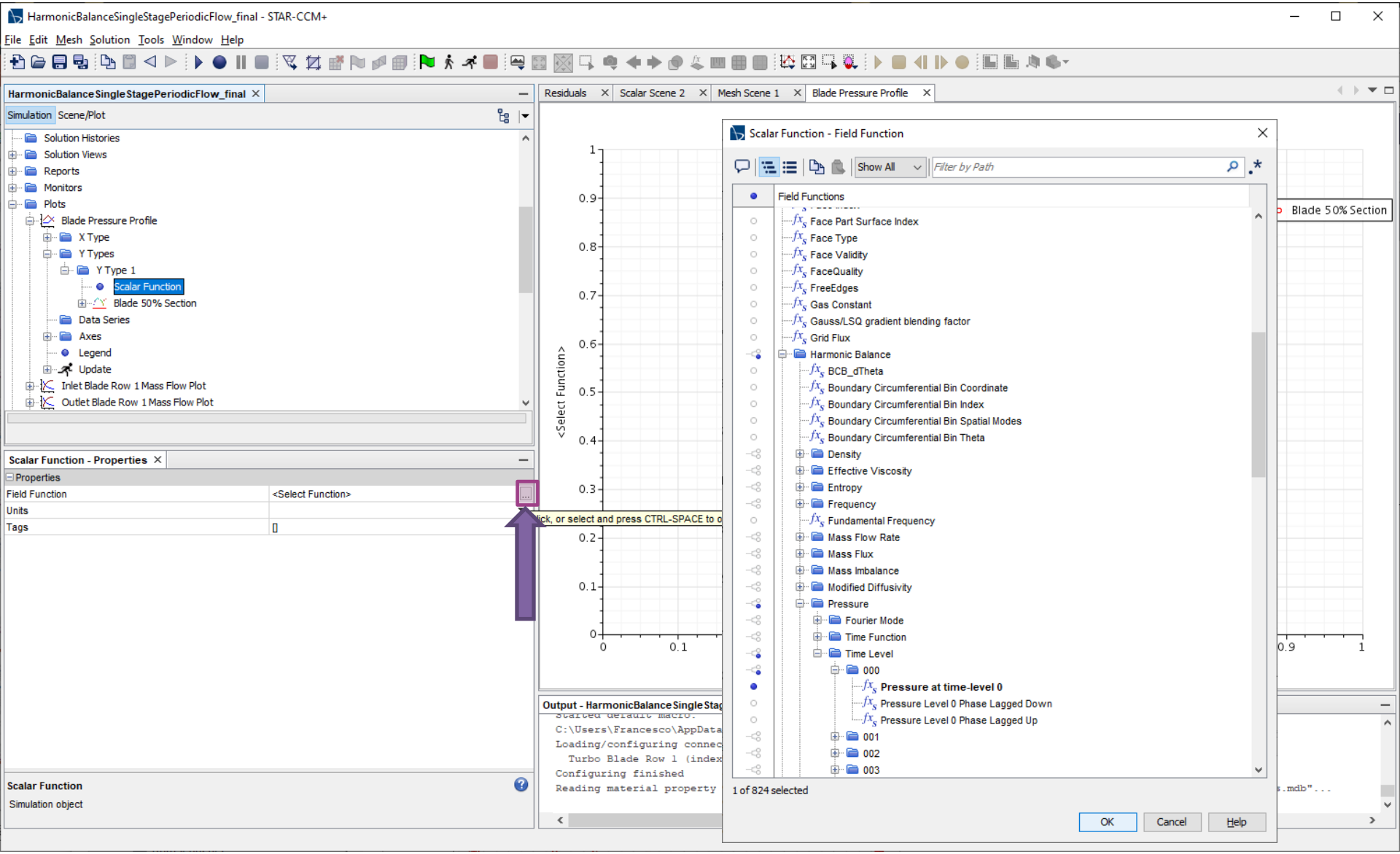

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