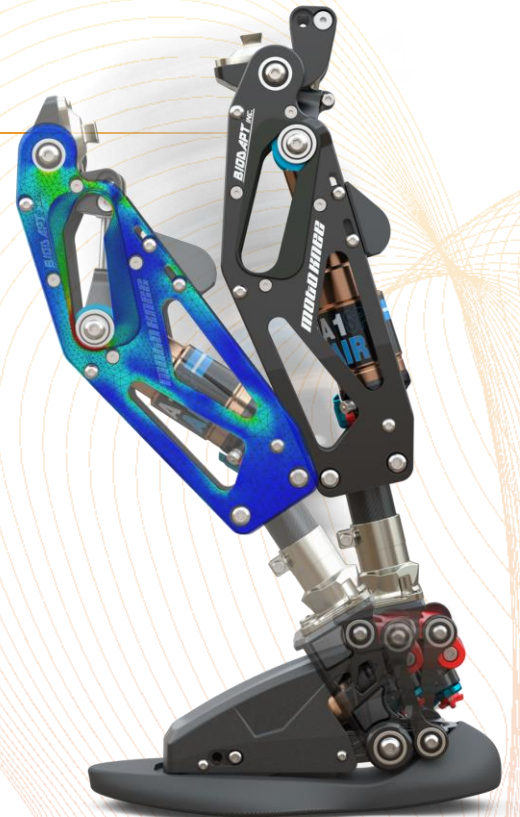


Достъпни инженерни симулации

За конкретната задача в точния момент



Пенко Ангелов
Експерт – техническа поддръжка







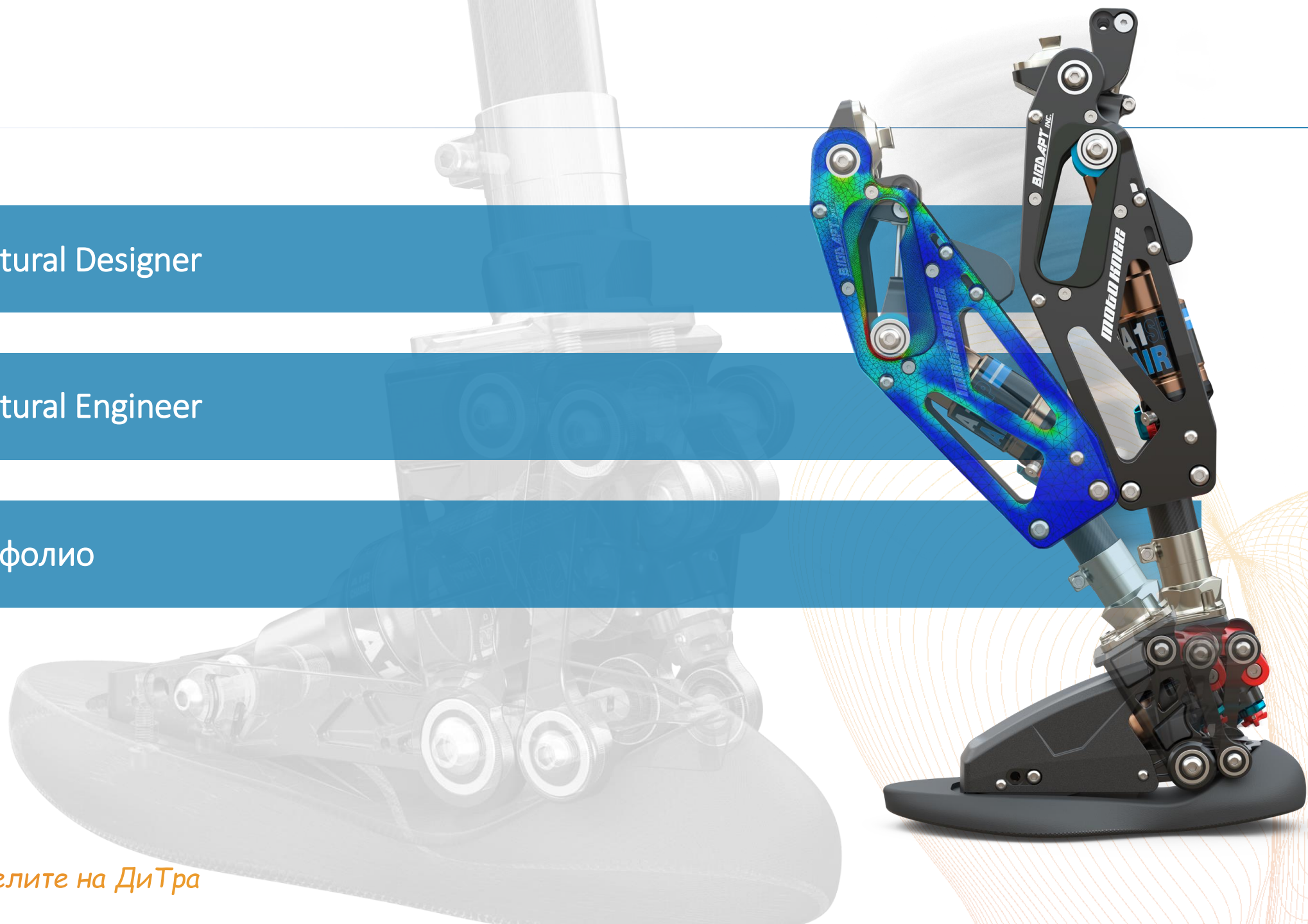
Structural Designer



Structural Engineer



Портфолио



XXI среща на приятелите на ДиТра



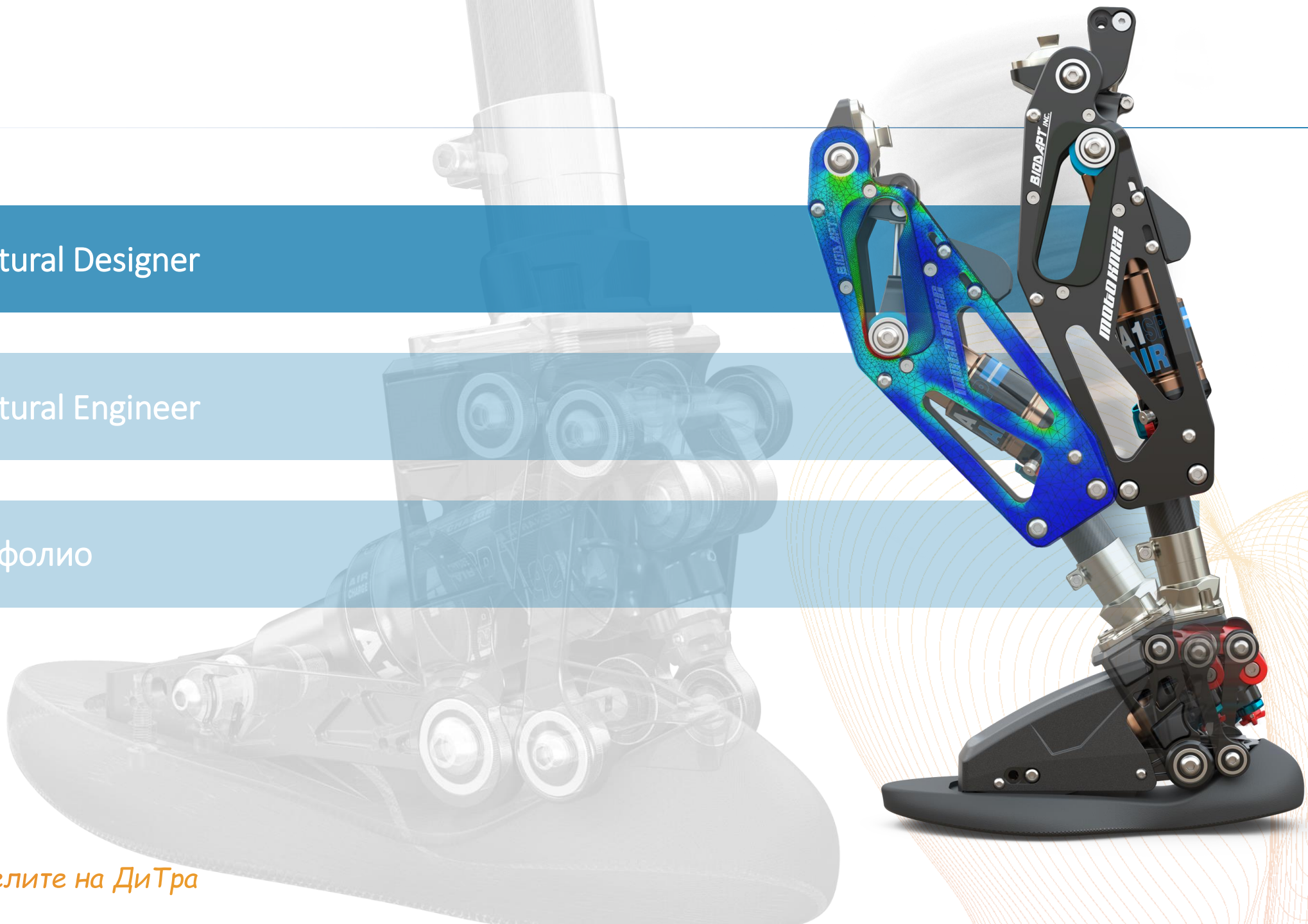
Structural Designer



Structural Engineer



Портфолио



XXI среща на приятелите на ДиТра

Structural Designer (SRD)

Linear Static

Frequency

Thermal

Buckling

Cloud Computing

Assistant

- ✓ Setup
- Materials
- Connections
- Restraints

	Bookmark Editor		Change Action
	Collaborative IP Management		Collaborative Lifecycle
	Converter for IGES		Converter for STEP
	Data Setup		Design IP Classification
	Exchange Management		Linear Structural Validation
	Manufacturing Finder		Material Definition
	Product Finder		Simulation Finder
	Simulation Job Monitor		Station Administration
	Station Launcher		System Finder

- Пълна асоциативност със SOLIDWORKS
- Поддръжка на други CAD формати
- Автоматично омрежване (+ ръчен контрол на мрежата)
- Възможност за локално или облачно изчисление
- Асистент за олекотен работен процес

Structural Designer (SRD)

Linear
Static

Frequency

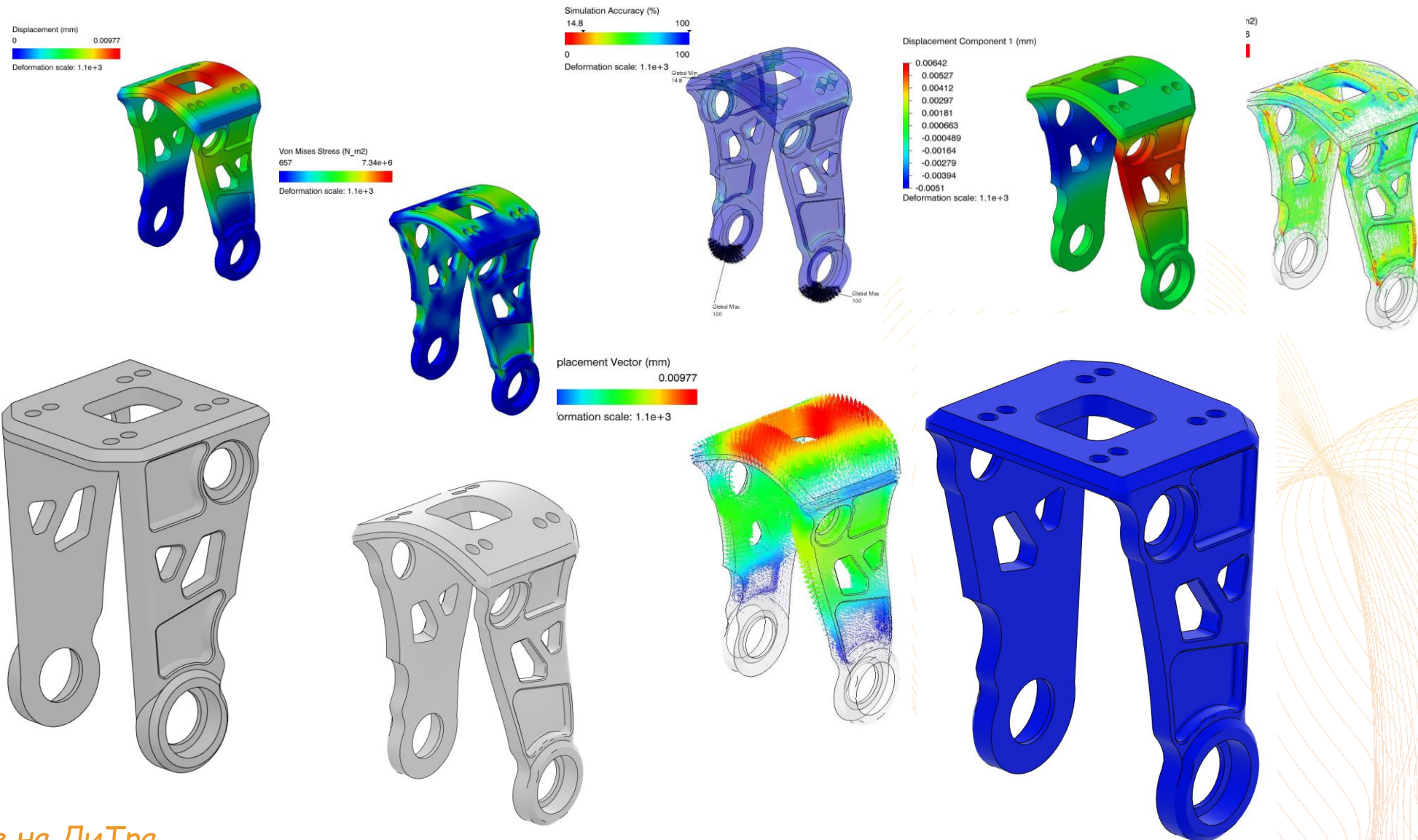
Thermal

Buckling

Cloud
Computing

Assistant

- ☒ Setup
- ☐ Materials
- ☐ Connections
- ☐ Restraints

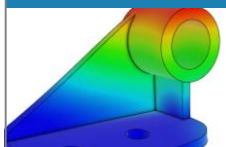




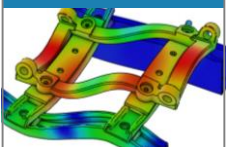
Structural Designer

Structural Designer (SRD)

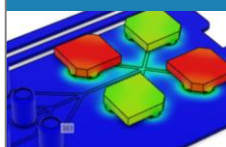
Linear
Static



Frequency



Thermal



Buckling

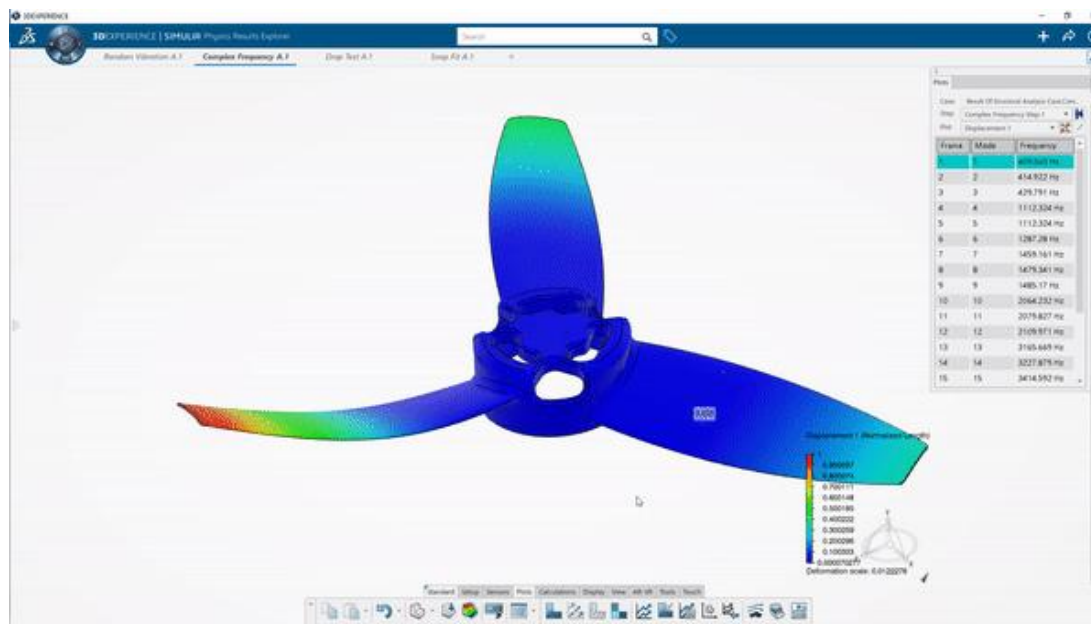


Cloud
Computing



Assistant

- ☒ Setup
- ☐ Materials
- ☐ Connections
- ☐ Restraints

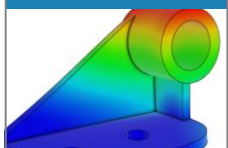




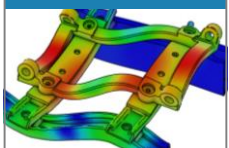
Structural Designer

Structural Designer (SRD)

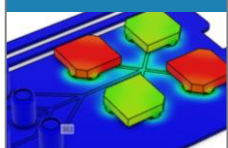
Linear
Static



Frequency



Thermal



Buckling

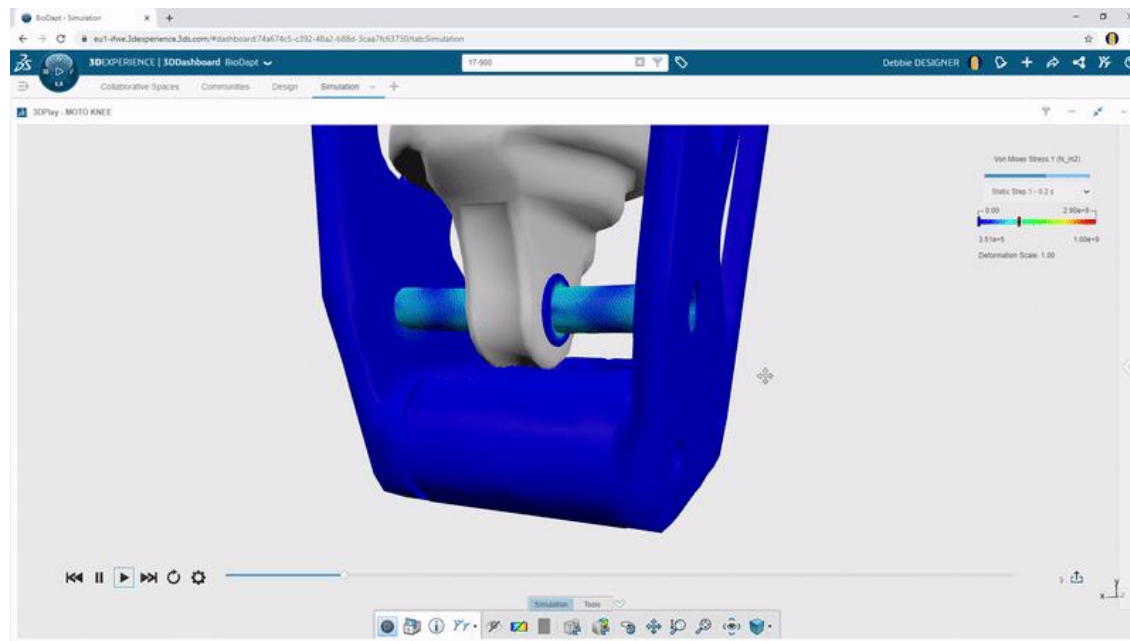


Cloud
Computing



Assistant

- ☒ Setup
- ☐ Materials
- ☐ Connections
- ☐ Restraints

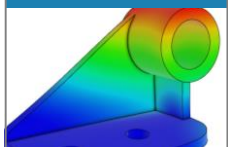




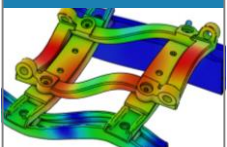
Structural Designer

Structural Designer (SRD)

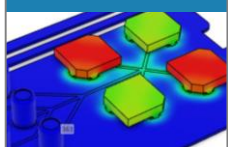
Linear
Static



Frequency



Thermal



Buckling

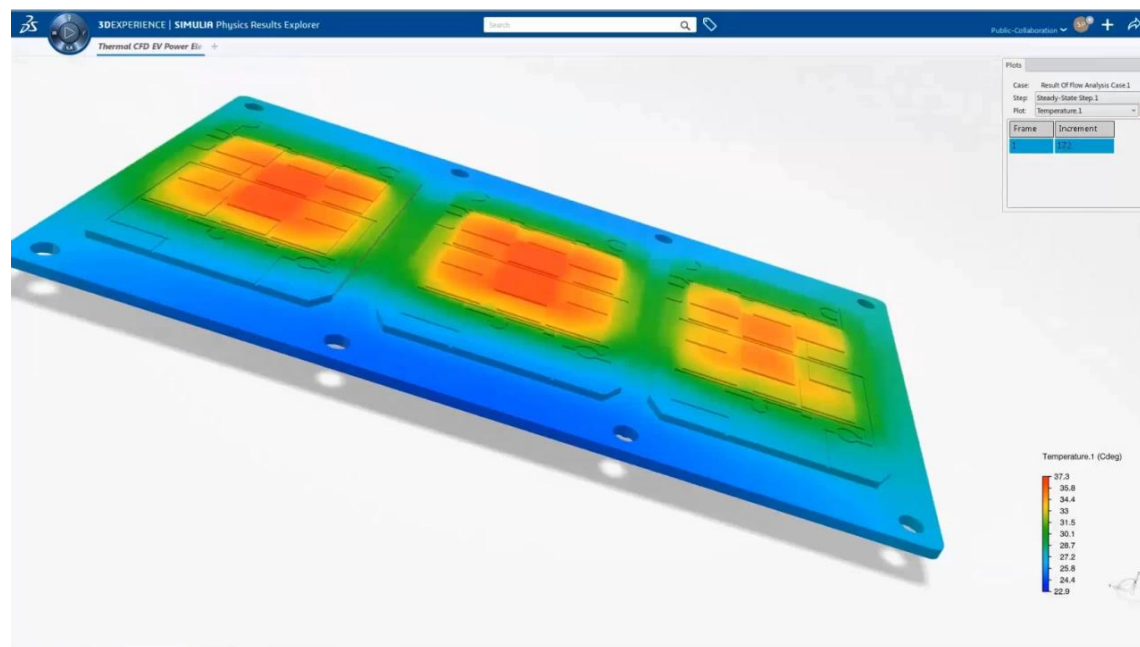


Cloud
Computing



Assistant

- ☒ Setup
- ☐ Materials
- ☐ Connections
- ☐ Restraints

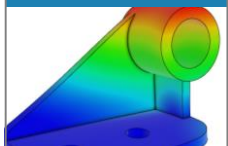




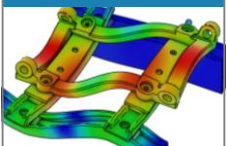
Structural Designer

Structural Designer (SRD)

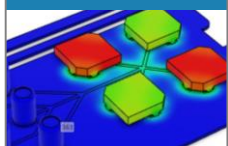
Linear
Static



Frequency



Thermal



Buckling

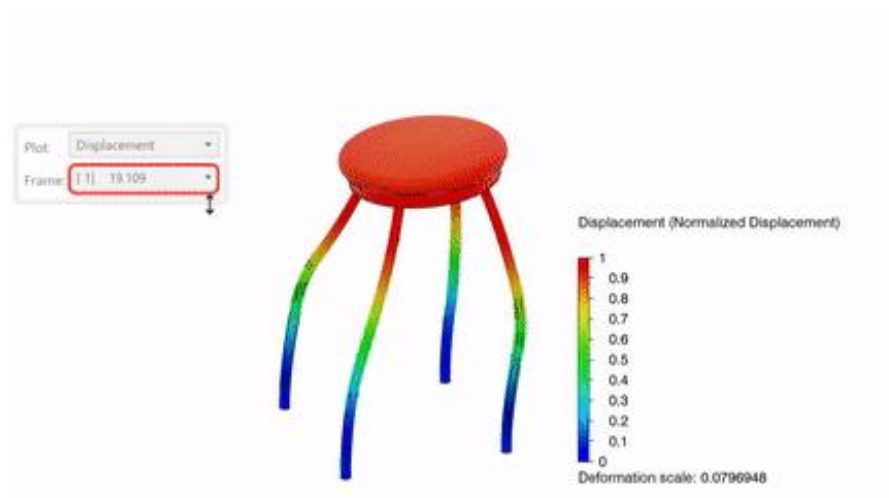


Cloud
Computing



Assistant

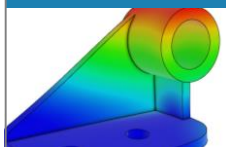
- ☒ Setup
- ☐ Materials
- ☐ Connections
- ☐ Restraints



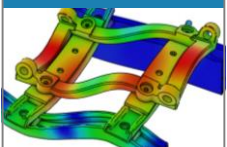
Structural Designer

Structural Designer (SRD)

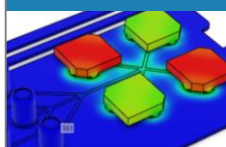
Linear
Static



Frequency



Thermal



Buckling



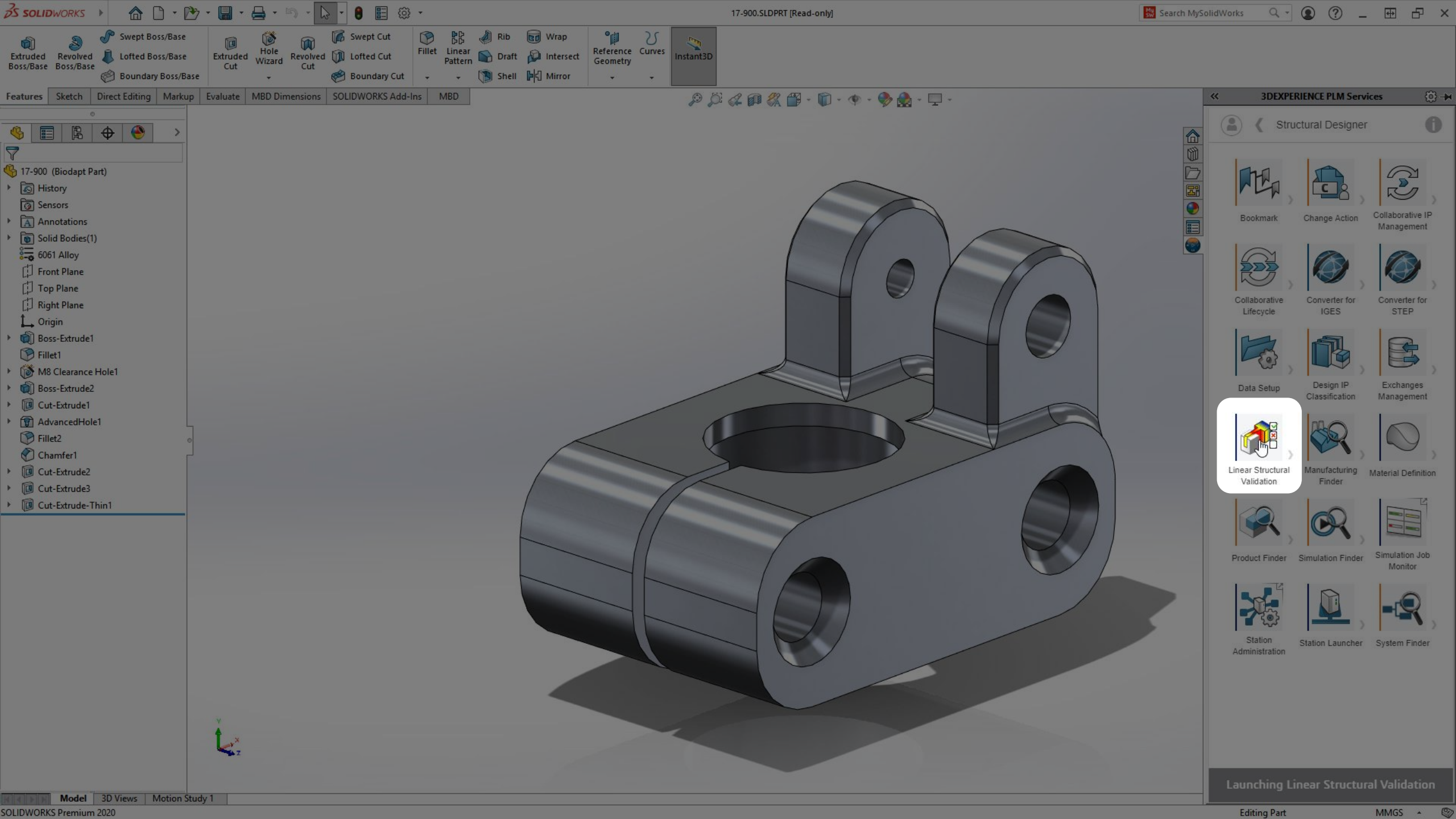
Cloud
Computing

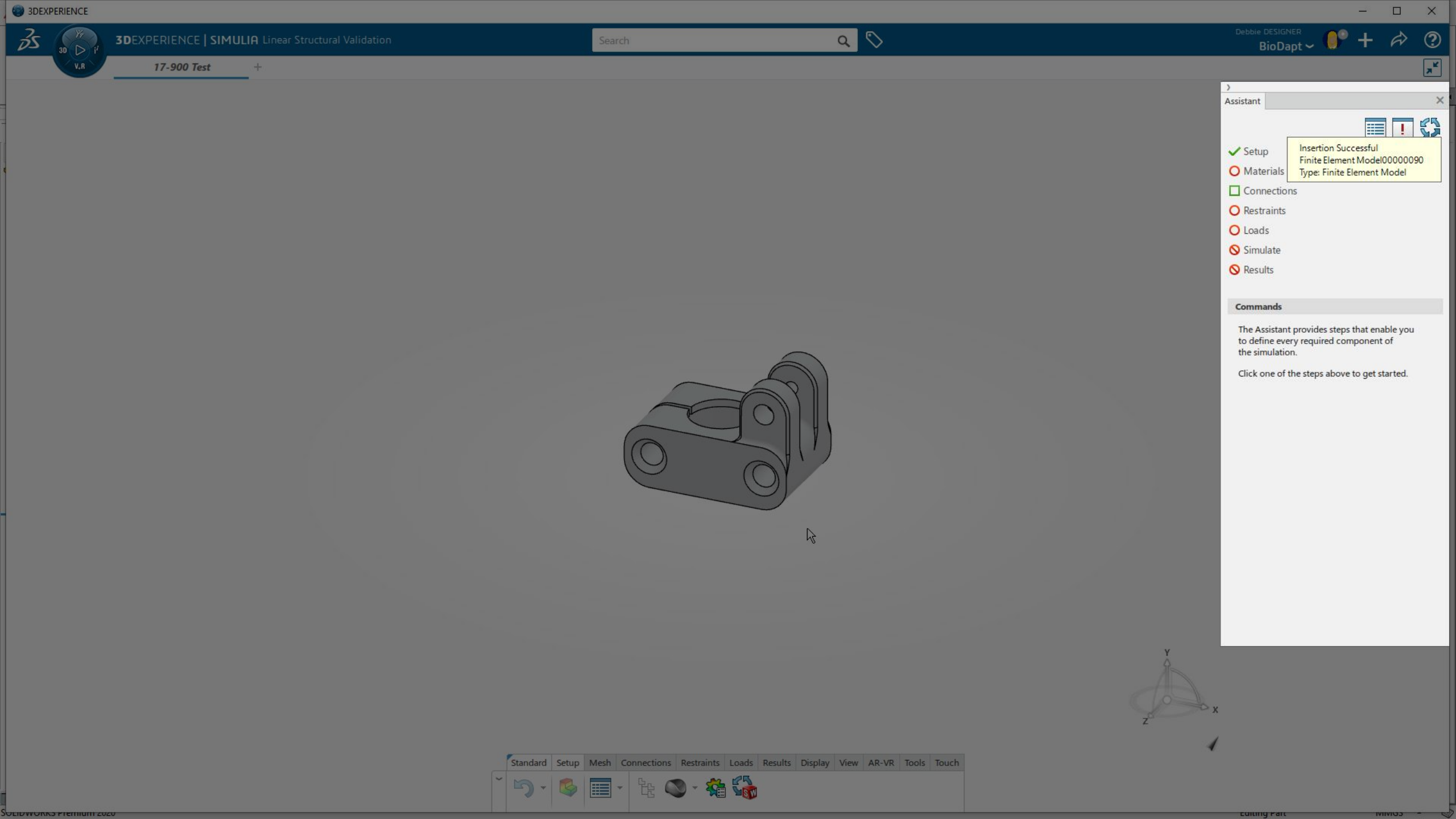


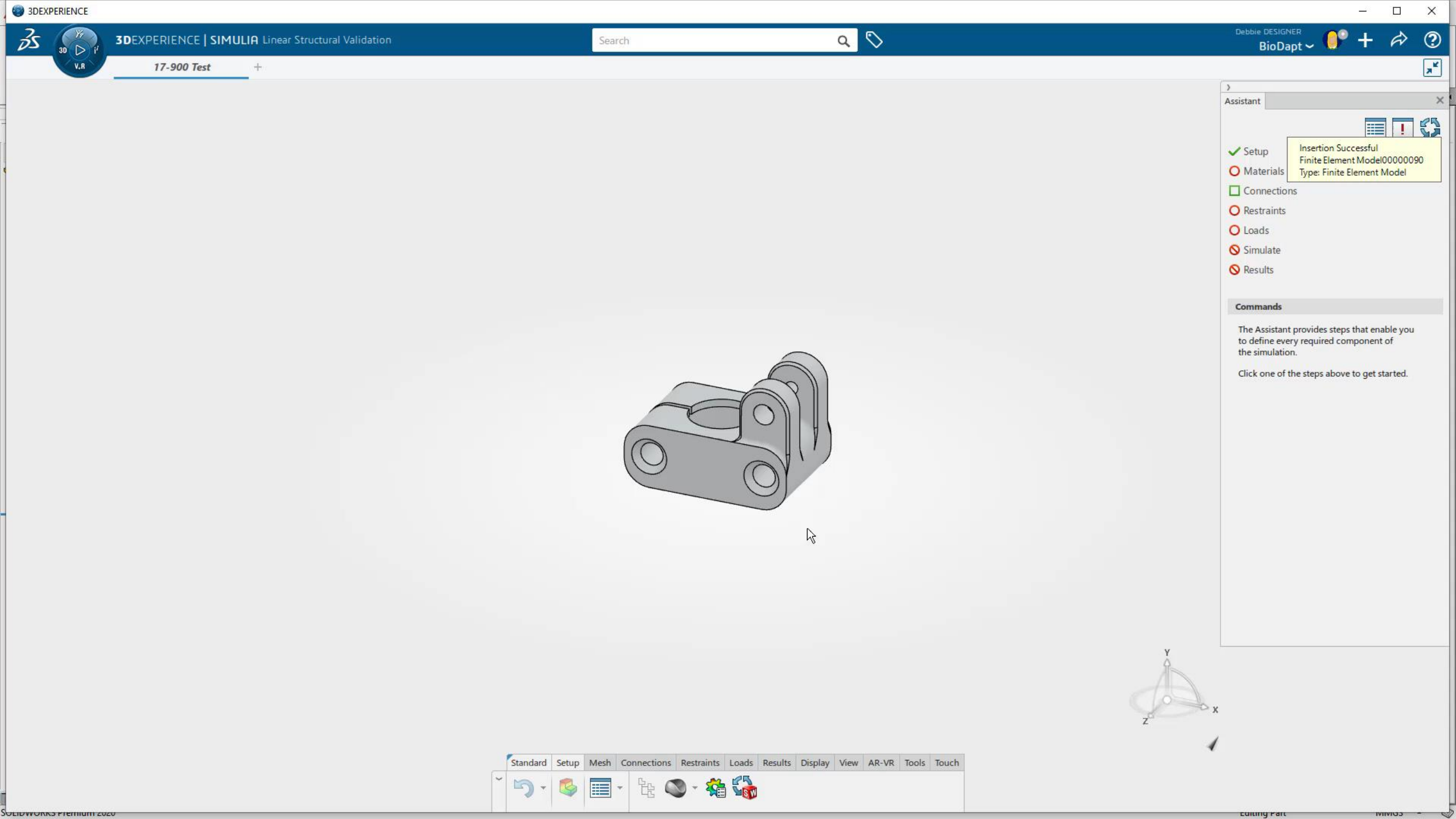
Assistant

- ✓ Setup
- ☐ Materials
- ☐ Connections
- ☐ Restraints









3DEXPERIENCE | 3DDashboard BioDapt

Search In Current Dashboard

Adam ANALYST

Collaborative Industry Innovator

3D Markup

3DPlay

3DSpace

Bookmark Editor

Change Action

Classify & Reuse

Collaboration & Approvals

Collaboration for Microsoft

Collaborative Lifecycle

Collaborative Tasks

Compare

IP Classify & Reuse

Issue 3D Review

Issue Management

Product Explorer

Project Execution

Project Gantt

Route Management

ENOVIA - Collaborative Lifecycle - R1132101102931 - MOTO KNEE A.1

```
graph LR; Private[Private] --> InWork[In Work]; InWork --> Frozen[Frozen]; Frozen --> Released[Released]; Released --> Obsolete[Obsolete]; InWork -- Release --> Released; Released -- Make private --> Private;
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Graph	Title	Revision	Maturity State	Creation Date	Modification Date	Description
	MOTO KNEE	A.1	In Work	9/7/2020, 2:00:00 AM	9/7/2020, 2:59:24 AM	

Lifecycle Collaboration

Your selection has been updated

Waiting for r1132101102931-us1-space.3dexperience.3ds.com...



Structural Designer

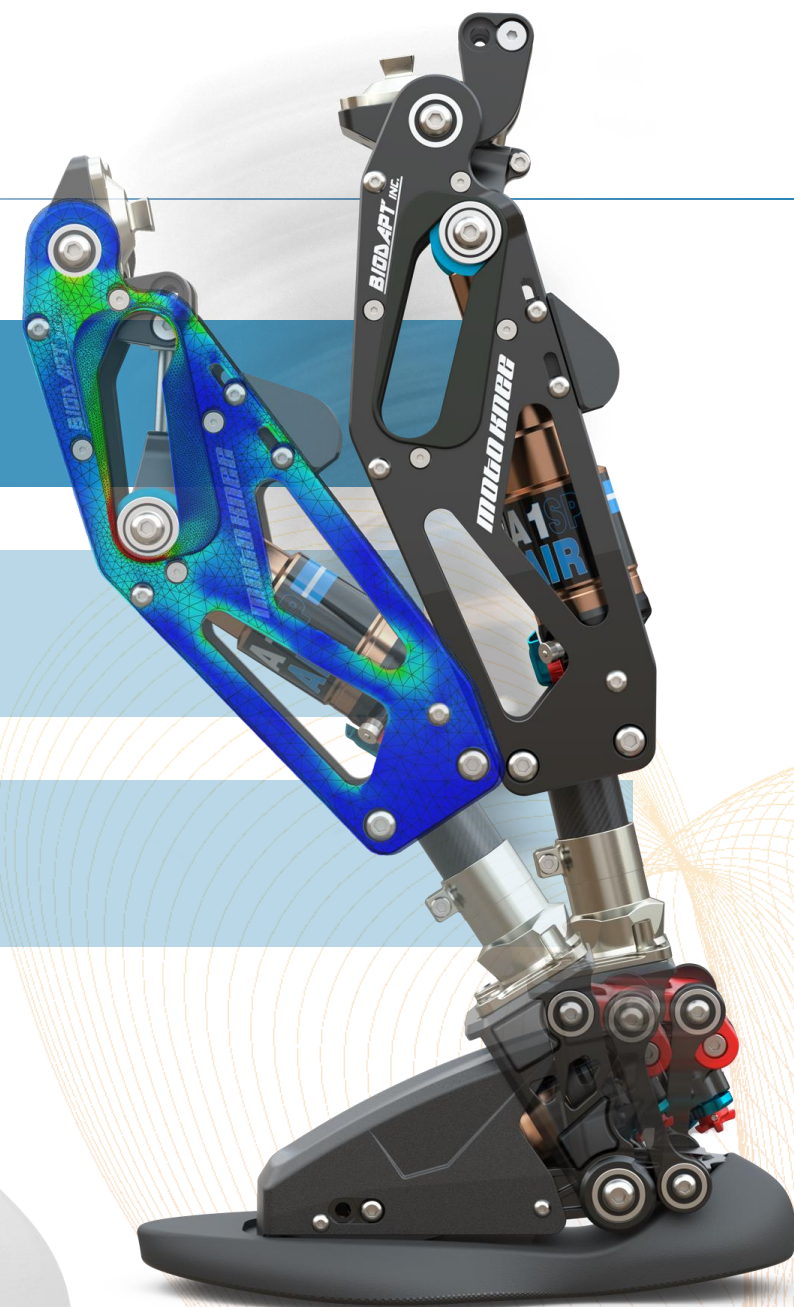


Structural Engineer



Портфолио

XXI среща на приятелите на ДиТра





Structural Designer

Достъпни инженерни симулации

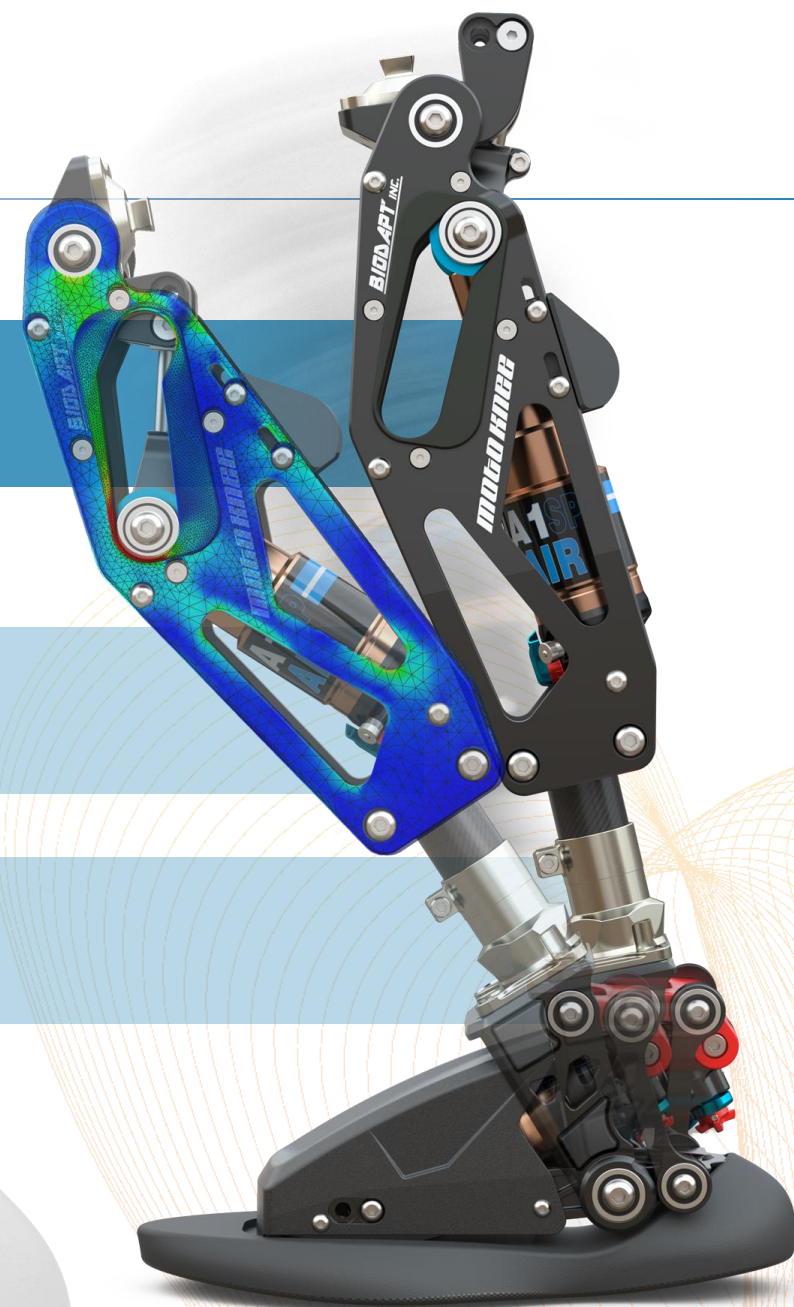


Structural Engineer



Портфолио

XXI среща на приятелите на ДиТра





Structural Designer

Достъпни инженерни симулации

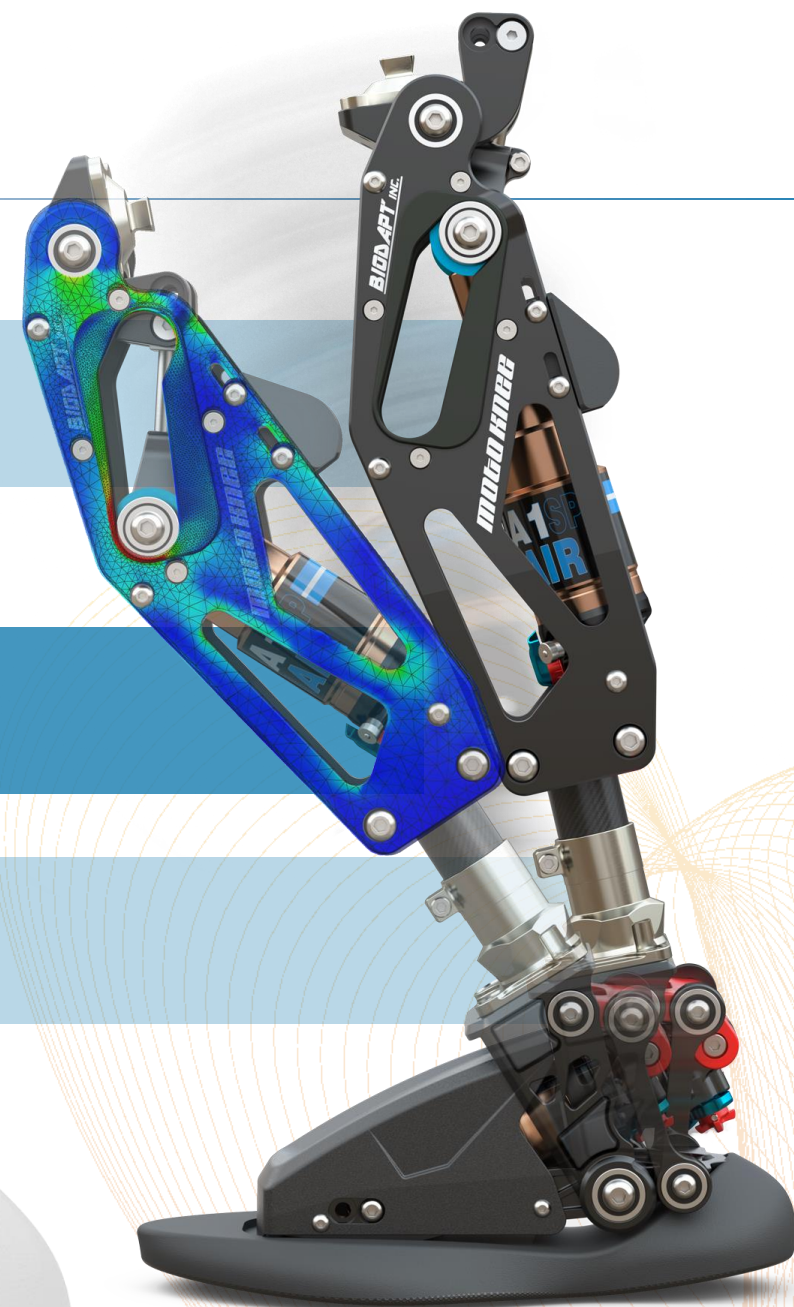


Structural Engineer



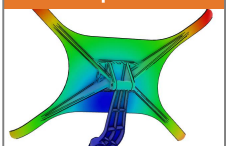
Портфолио

XXI среща на приятелите на ДиТра



Structural Engineer (SLL)

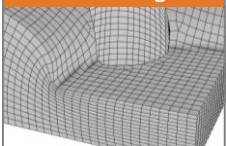
Harmonic Response



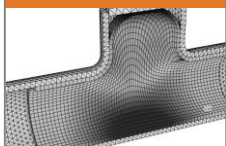
Modal Dynamic



Advanced Meshing



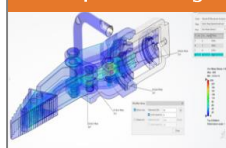
Advanced Elements



Multi-Step



Advanced Postprocessing



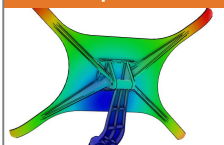
 Bookmark Editor	 Change Action
 Collaborative IP Management	 Collaborative Lifecycle
 Converter for IGES	 Converter for STEP
 Data Setup	 Design IP Classification
 Exchange Management	 Linear Structural Scenario Creation
 Manufacturing Finder	 Material Definition
 Physics Results Explorer	 Product Finder
 Simulation Finder	 Simulation Job Monitor
 Station Administration	 Station Launcher
 Structural Model Creation	 System Finder

- Допълнителни възможности за анализ на изделията.
- Реалистично поведение при всички стандартни условия на конструктивно натоварване и гранични условия.
- Автоматично откриване на контактни повърхнини.
- Висококачествено омрежване директно върху геометрията на модела с възможност за допълнителен контрол на база правила.
- Използва доказана технология от Abaqus с точни структурни и термични симулации в интуитивен работен процес.
- Лесно и интуитивно сравнение и анализ на резултатите.
- Възможност за надграждане.

Structural Engineer

Structural
Engineer (SLL)

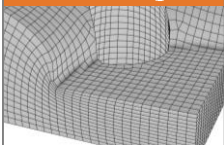
Harmonic
Response



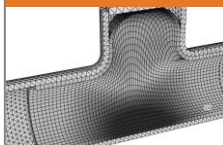
Modal
Dynamic



Advanced
Meshing



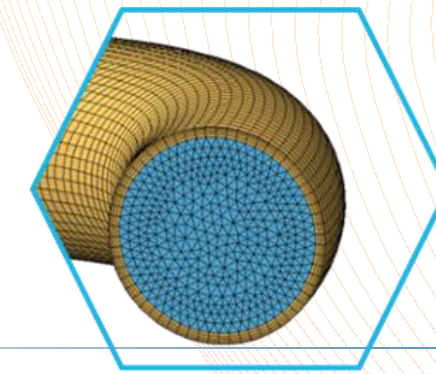
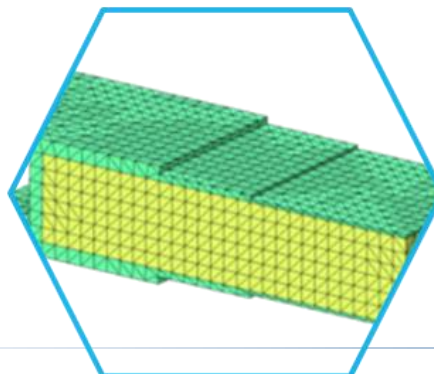
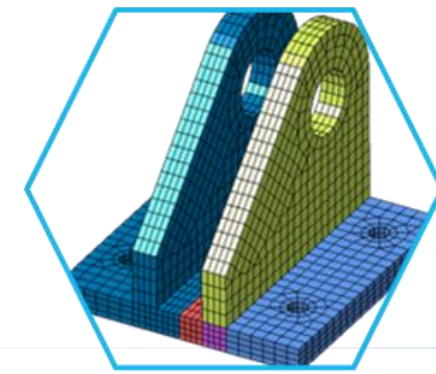
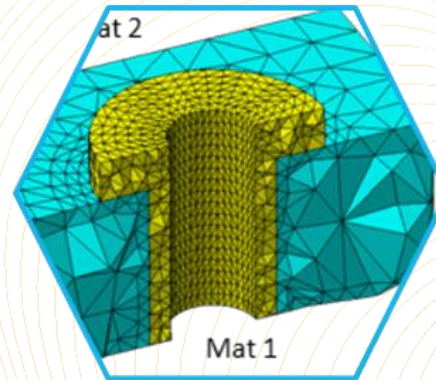
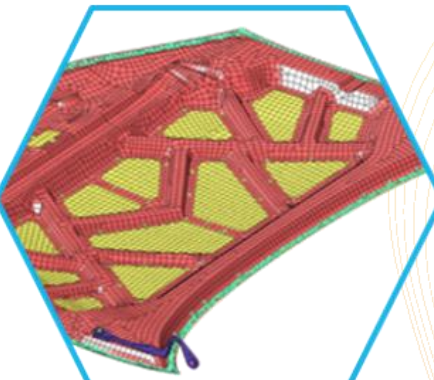
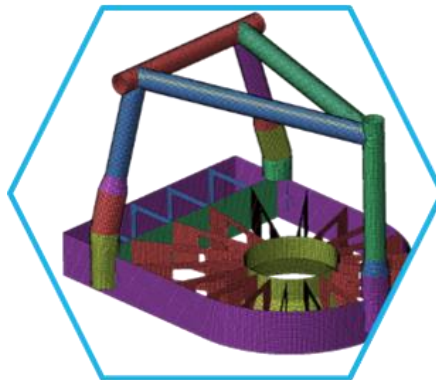
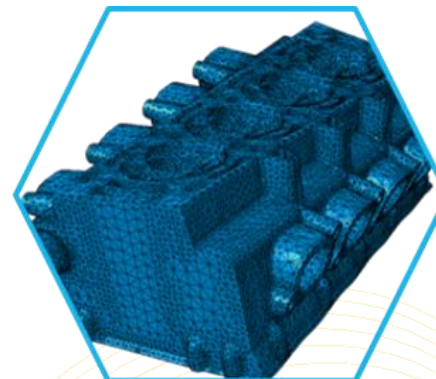
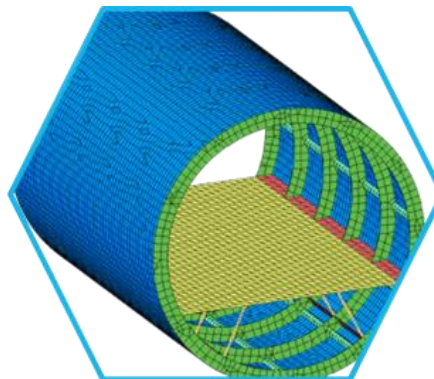
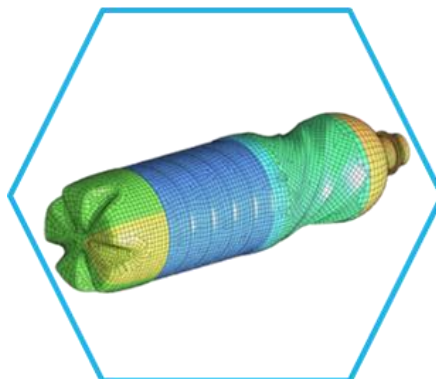
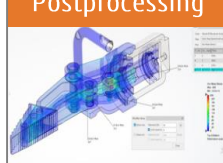
Advanced
Elements



Multi-Step



Advanced
Postprocessing

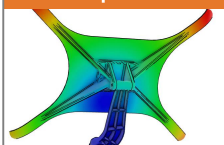




Structural Engineer

Structural
Engineer (SLL)

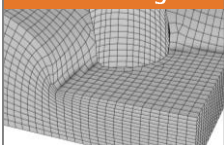
Harmonic
Response



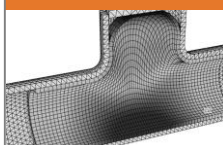
Modal
Dynamic



Advanced
Meshing



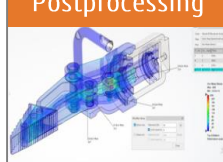
Advanced
Elements



Multi-Step



Advanced
Postprocessing



Feature Manager

Viewing all 18

In...	Vi	Name	Type	Category	Definition	Static Step.1	Static Step.2	Frequency St...	Complex Fre...
☒	☒	Fixed Displacement.1	Fixed Displacement	Restraints	Translation X, Tr...				
☒	☒	Fixed Displacement.2	Fixed Displacement	Restraints	Translation X, Tr...				
☒	☒	Fixed Displacement.3	Fixed Displacement	Restraints	Translation X, Tr...				
		Global Element Type Assignment.1	Global	Element Type Ass...					
☒		Global Virtual Bolt Output.1	Global Virtual Bolt O...	Output Requests	Field and History				
☒		Output.1	Field	Output Requests	Field				
☒		Output.2	History	Output Requests	History				
☒		Output.3	Field	Output Requests	Field				
☒		Output.4	Field	Output Requests	Field				
		PAD_ROTATOR	Contact Property	Interactions					
☒	☒	Pressure.1	Pressure	Loads	500000 N_m2				
☒	☒	Pressure.2	Pressure	Loads	500000 N_m2				
☒	☒	Sliding Velocity.1	Sliding Velocity	Loads	47.746 turn_mn				

Static Step

Name: Static Step.1

Step time: 1s

▼ Incrementation

Maximum increments: 1000

Time incrementation selection: Automatic

Initial time increment: 1s

Minimum time increment: 1e-005s

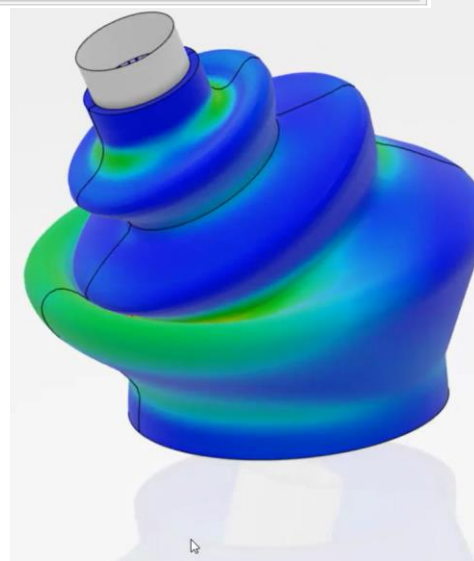
Maximum time increment: 1s

► Stabilization

► Continuation Data: None

► Advanced

OK Cancel



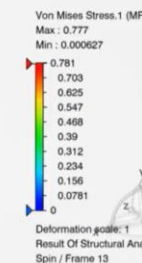
Plots

Case: Result Of Structural Analysis Case.2

Step: Spin

Plot: Von Mises Stress.1

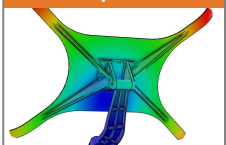
Frame	Increment	Time
11	10	0.678 s
12	11	0.703 s
13	12	0.728 s
14	13	0.766 s
15	14	0.822 s
16	15	0.906 s
17	16	0.93 s
18	17	0.938 s
19	18	0.952 s
20	19	0.971 s
21	20	0.979 s



XXI среща на приятелите на ДиТра

Structural Engineer (SLL)

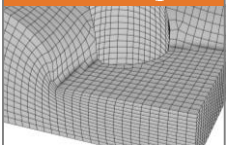
Harmonic Response



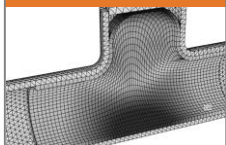
Modal Dynamic



Advanced Meshing



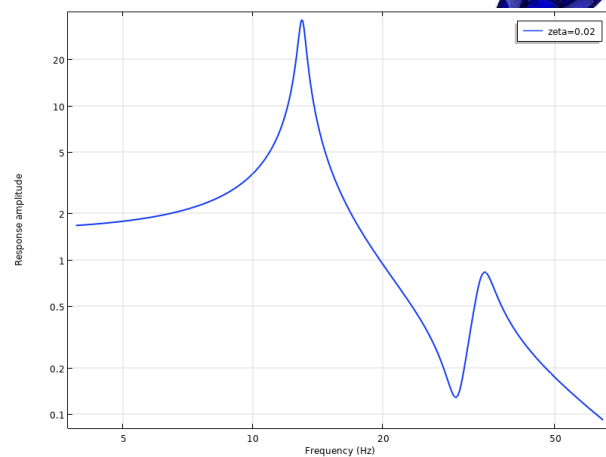
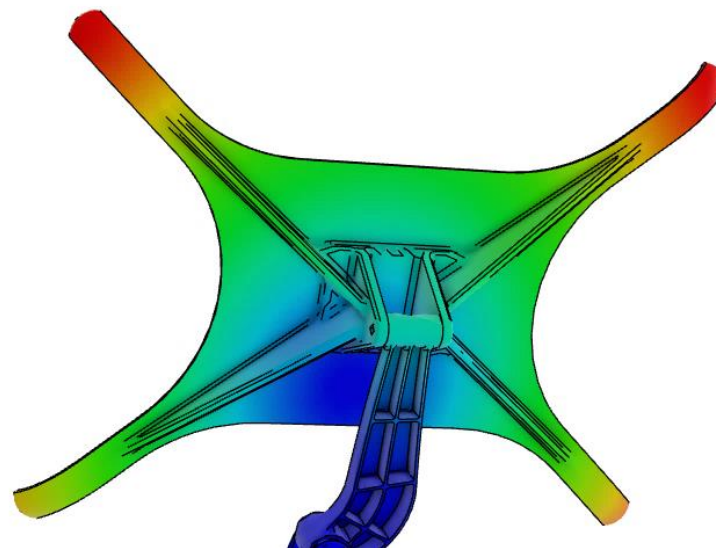
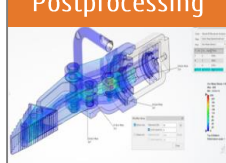
Advanced Elements



Multi-Step



Advanced Postprocessing

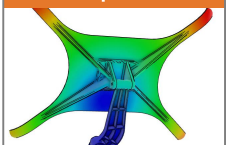




Structural Engineer

Structural
Engineer (SLL)

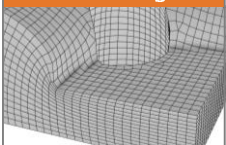
Harmonic
Response



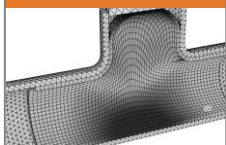
Modal
Dynamic



Advanced
Meshing



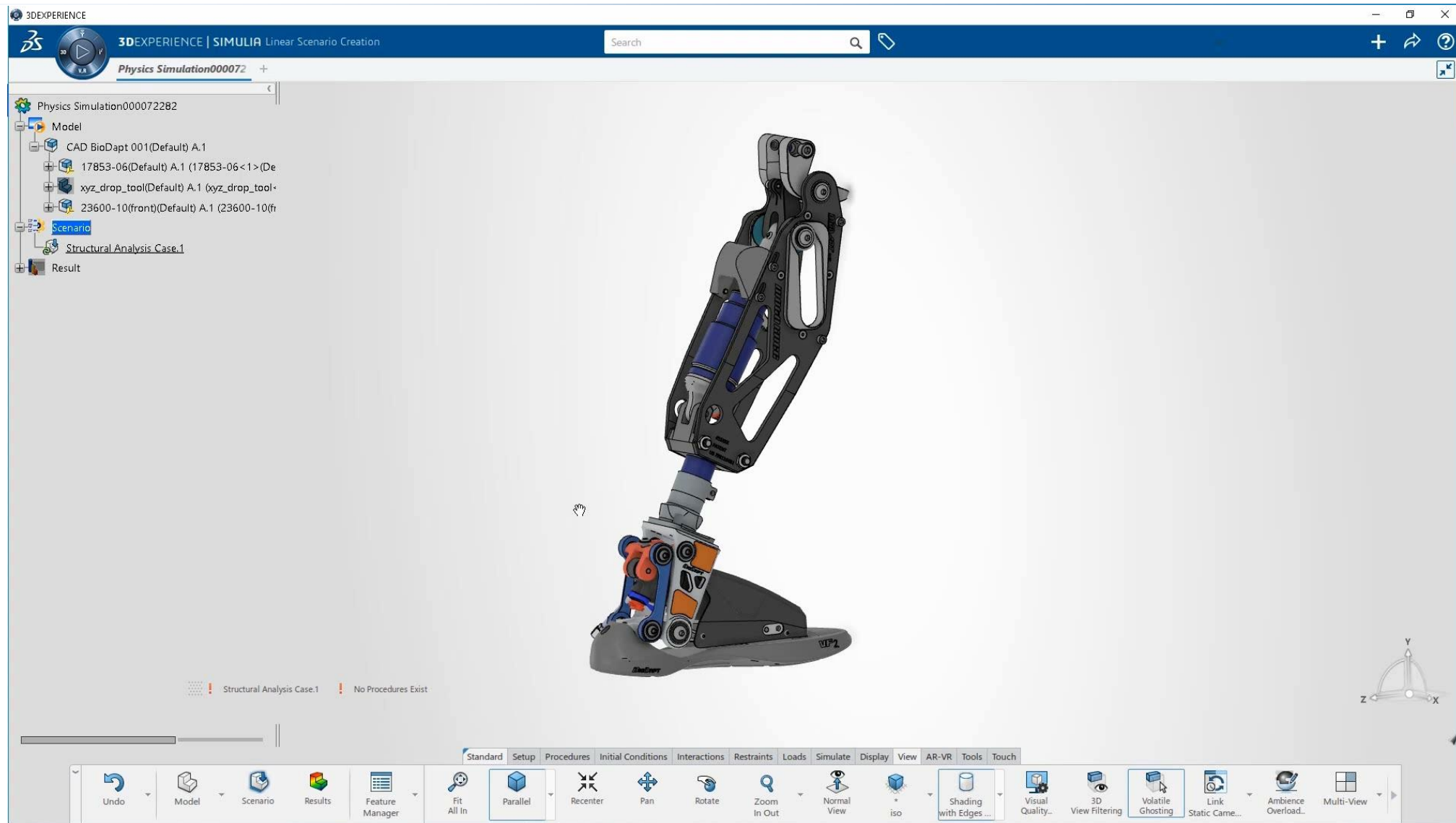
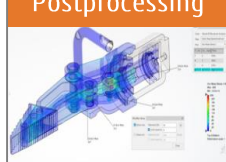
Advanced
Elements



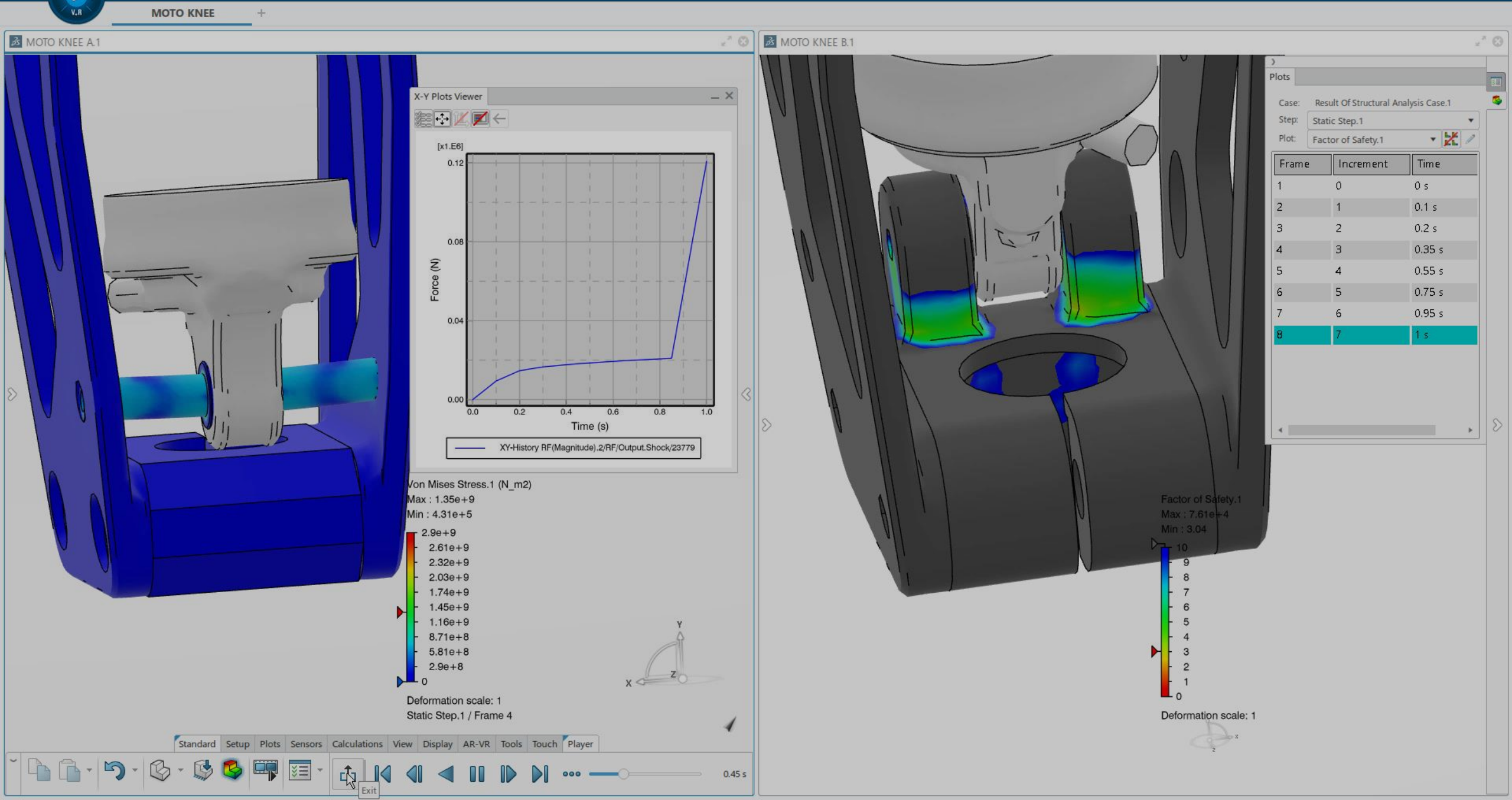
Multi-Step



Advanced
Postprocessing

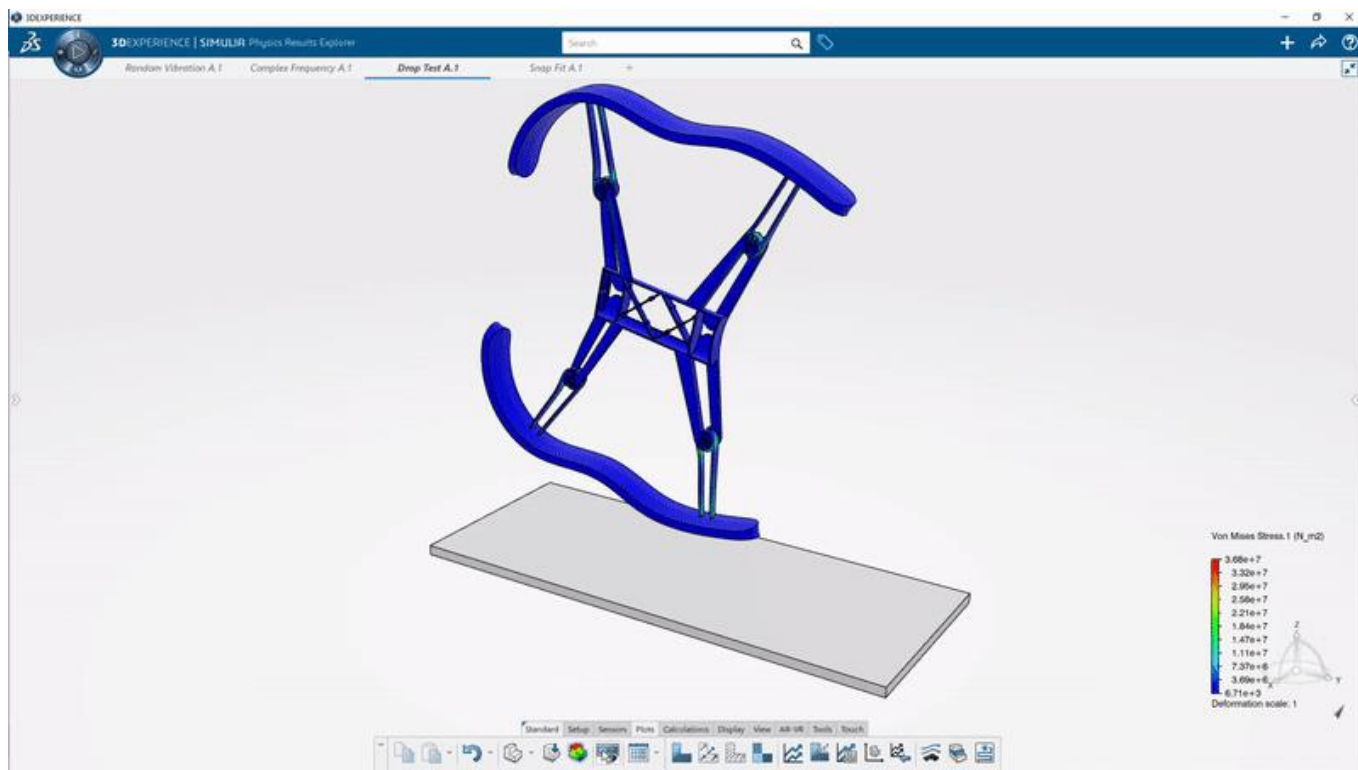


XXI среща на приятелите на ДиТра



Където има интернет, има и облаци

... без опасност от валежи.





Structural Designer

Достъпни инженерни симулации

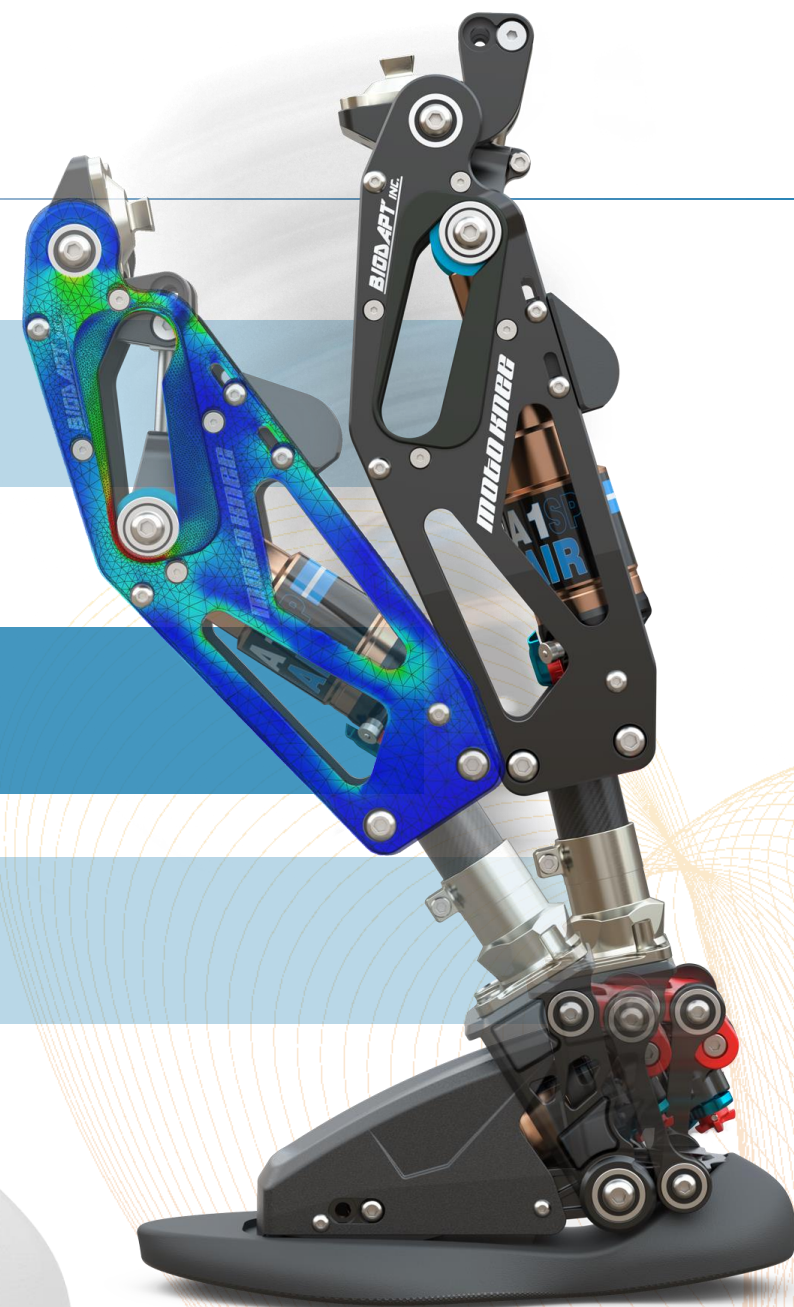


Structural Engineer



Портфолио

XXI среща на приятелите на ДиТра





Structural Designer

Достъпни инженерни симулации



Structural Engineer

Информирани решения за подобряване на производителността на продуктите



Портфолио

XXI среща на приятелите на ДиТра





Structural Designer

Достъпни инженерни симулации



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Портофолио

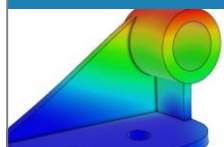
Structural Designer (SRD)

Structural Engineer (SLL)

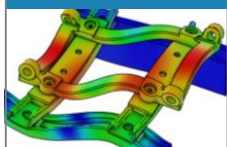
Structural Performance Engineer (SFO)

Structural Mechanics Engineer (SSU)

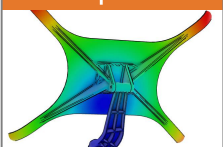
Linear Static



Frequency



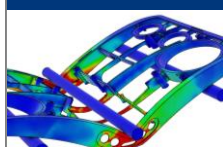
Harmonic Response



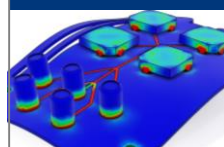
Modal Dynamic



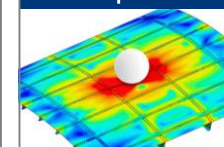
Nonlinear Static



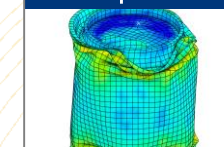
Thermal-Structural



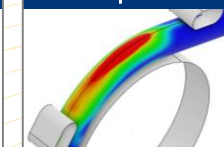
NL Dynamic Implicit



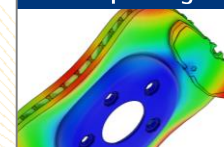
NL Dynamic Explicit



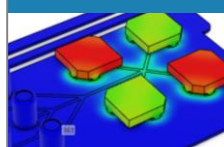
Quasi-Static Explicit



Complex Frequency



Thermal



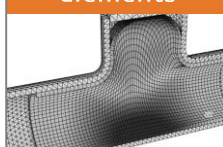
Buckling



Advanced Meshing



Advanced Elements



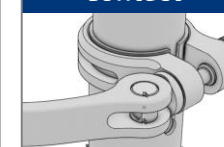
Material Failure



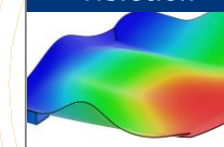
Advanced Connectors



Advanced Contact



Random Vibration



Geometry Preparation



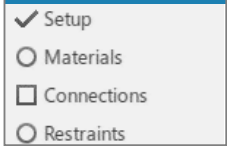
Material Calibration



Cloud Computing



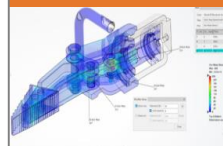
Assistant



Multi-Step



Advanced Postprocessing



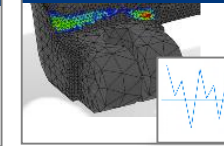
General Contact



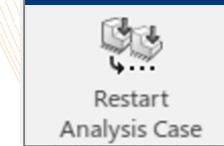
Advanced Materials



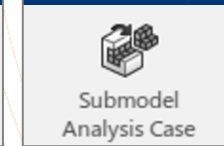
*Fatigue



Restart

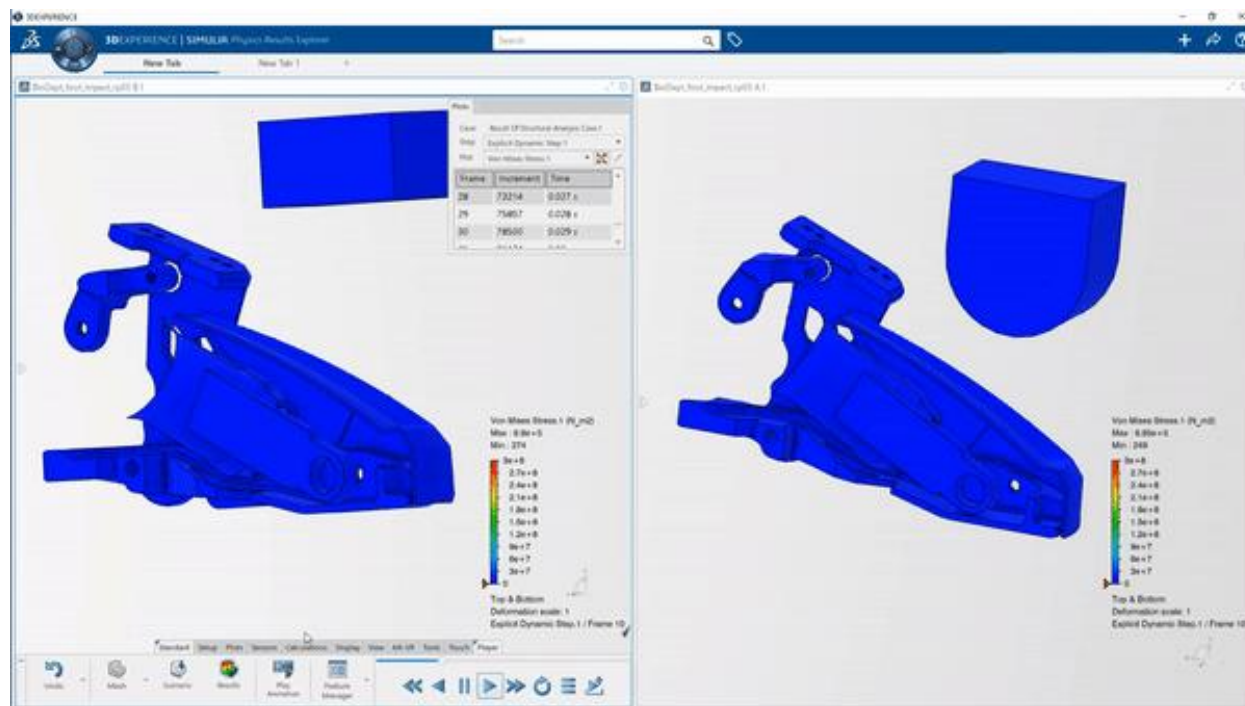


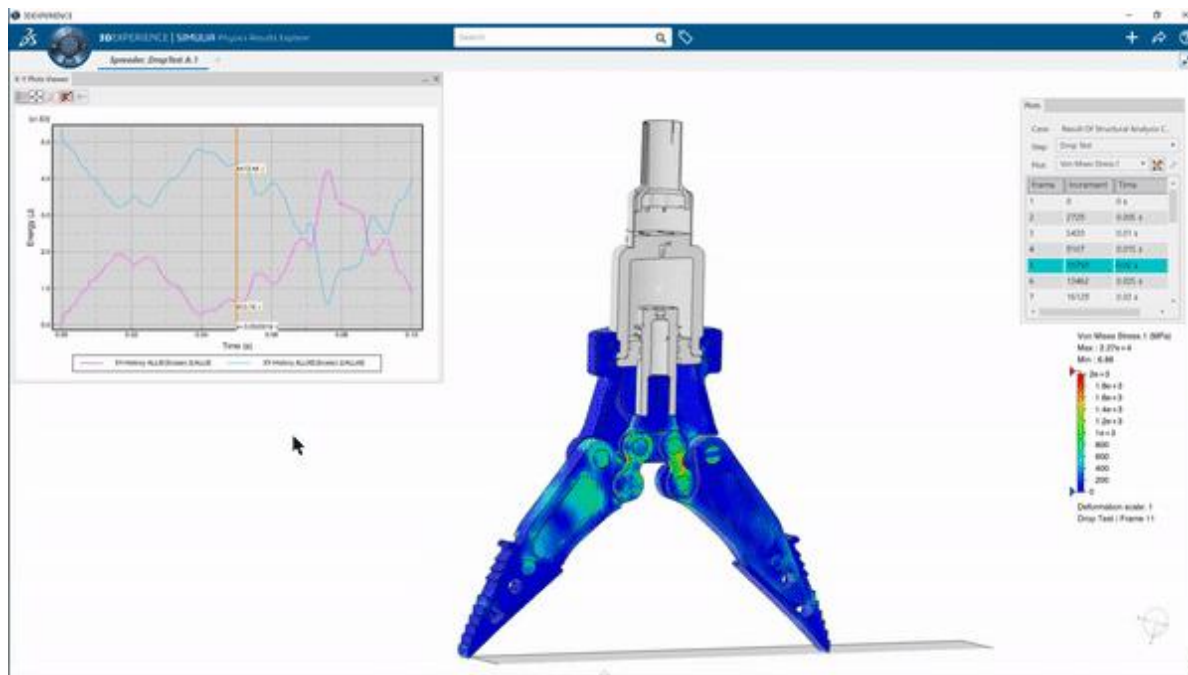
Sub-Modelling

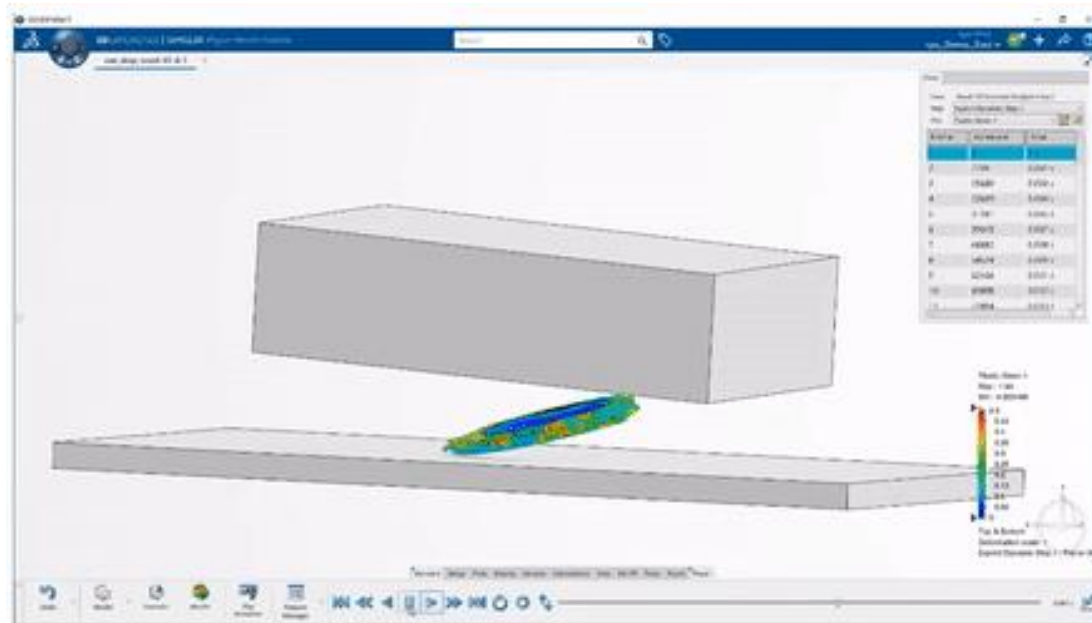


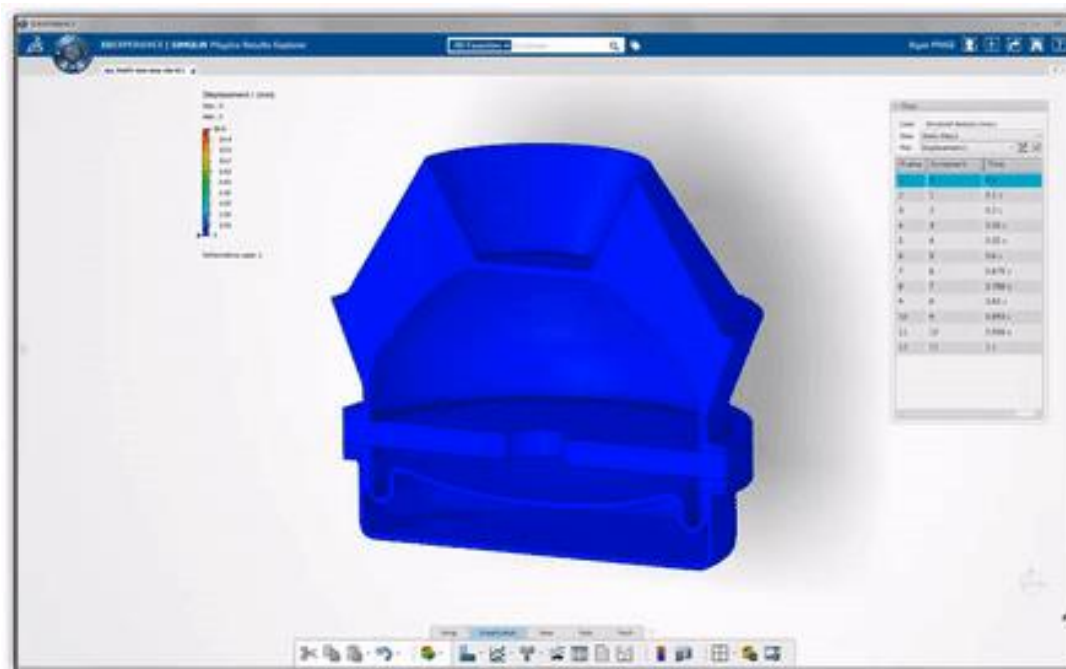
Preloading

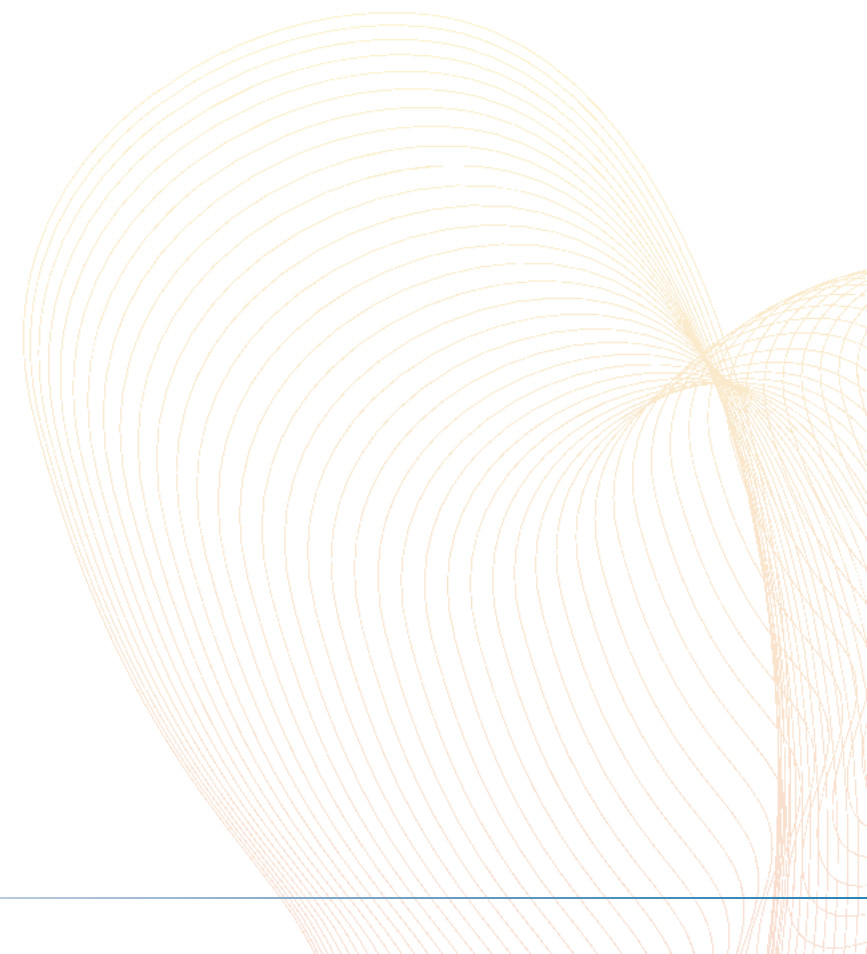
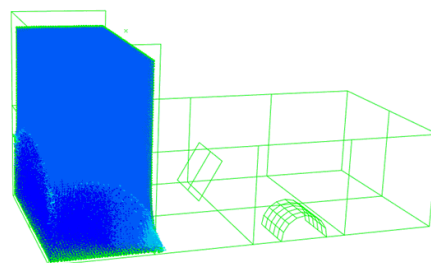
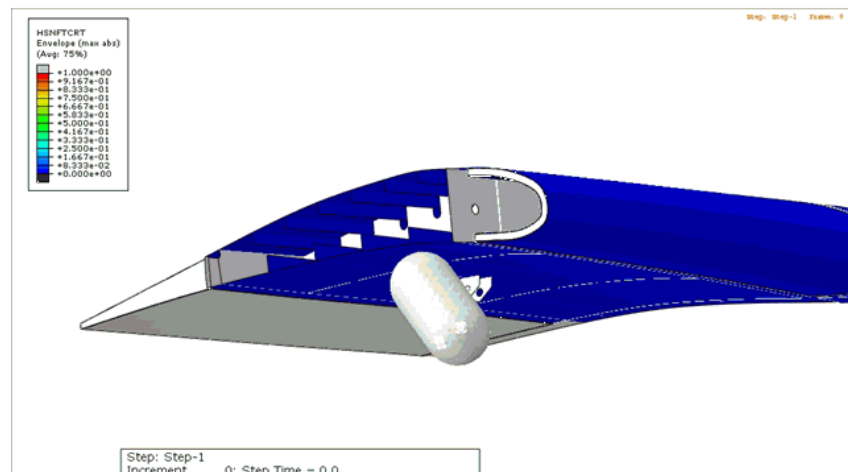
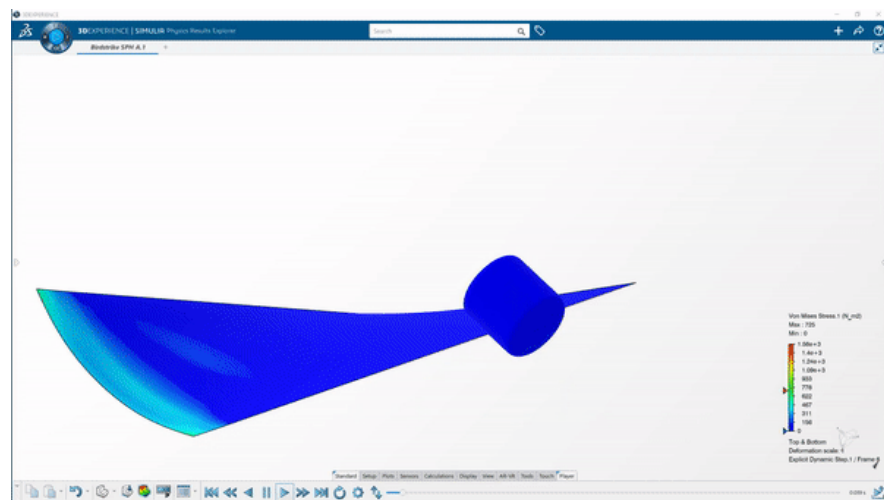














Structural Designer

Достъпни инженерни симулации



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Портфолио

Мощни технологии за справяне със сложни изследвания с увереност





Structural Designer

Достъпни инженерни симулации



Structural Engineer

Информирани решения за подобряване на производителността на продуктите



Портфолио

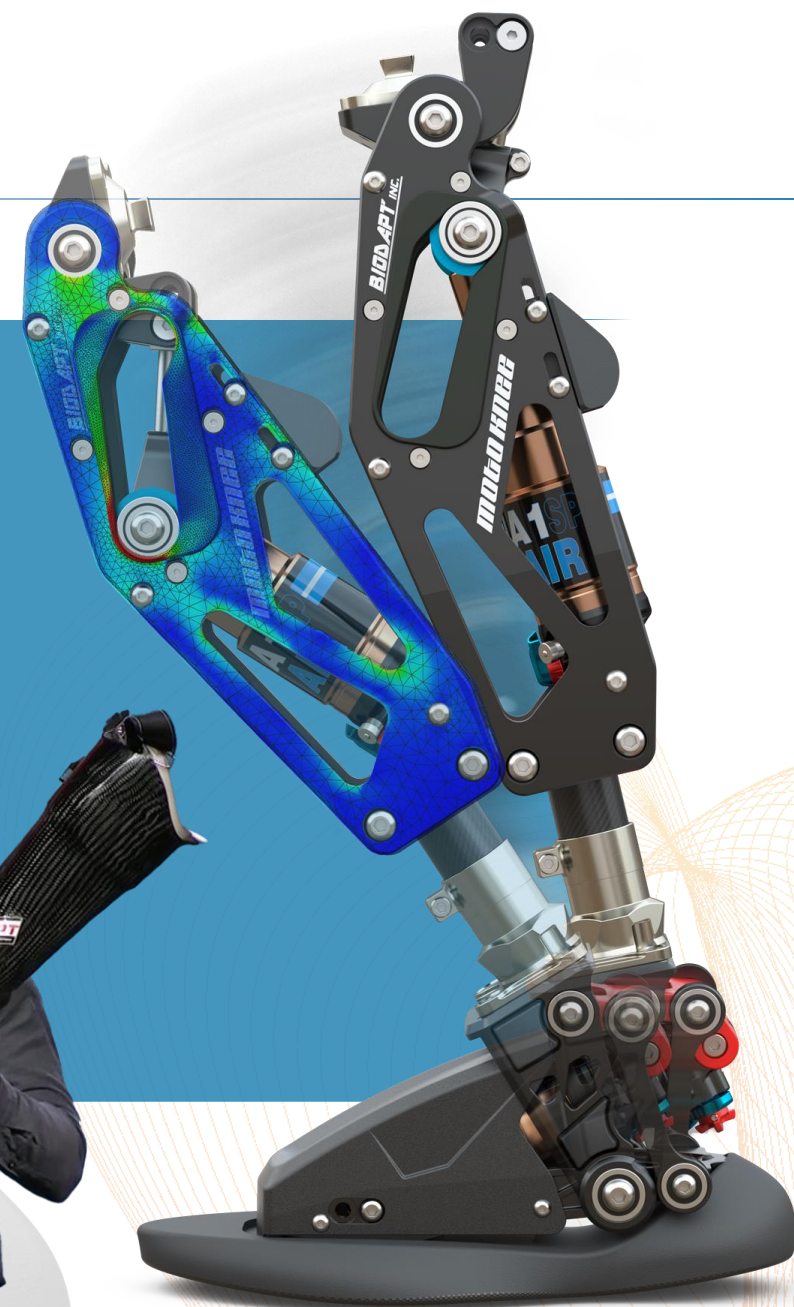
Мощни технологии за справяне със сложни изследвания с увереност





“Имаме възможност да проверим строгите изисквания за издръжливостта и деформацията... да анализираме натоварването и да моделираме около диапазона на движение... Откриваме оптималните размери, дизайн, материали... за да бъдат продуктите ни възможно най-леки и здрави.”

Mike SCHULTZ
BioDapt



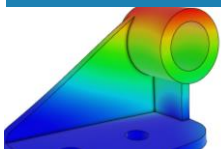


Промоция 3DEXPERIENCE Works Simulation Adoption

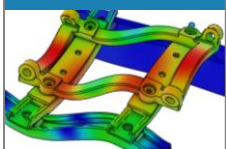
SOLIDWORKS

Structural Designer (SRD)

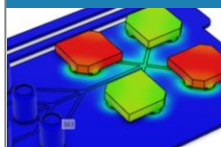
Linear
Static



Frequency



Thermal



Buckling



Cloud
Computing



Assistant

- ✓ Setup
- Materials
- Connections
- Restraints

Collaborative Business

Collaborative Industry

Simulation Collaborator

Collaborative Designer for
SOLIDWORKS

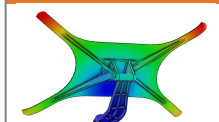
3DEXPERIENCE Works

SOLIDWORKS

SOLIDWORKS Premium

Structural Engineer (SLL)

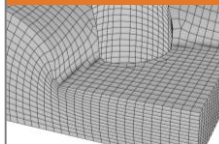
Harmonic
Response



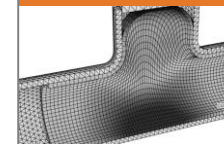
Modal
Dynamic



Advanced
Meshing



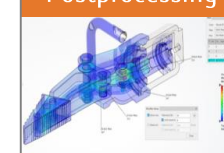
Advanced
Elements



Multi-Step



Advanced
Postprocessing



Collaborative Business

Collaborative Industry

Simulation Collaborator

Collaborative Designer for
SOLIDWORKS

3DEXPERIENCE Works



Промоция 3DEXPERIENCE Works Simulation Adoption

The screenshot displays the 3DEXPERIENCE 3DLearn dashboard. The top navigation bar includes the 3DLearn logo, a search bar, and user information (Penko Angelov, DiTra_test). The main content area is titled "3DEXPERIENCE WORKS Library" and "Consolidated learnings based on - 3DEXPERIENCE WORKS Library". It features a grid of 20 learning experience cards, each with a thumbnail image, a title, and a button indicating the number of learning paths and modules. The cards are organized into two columns and ten rows. The left sidebar contains a "My Apps" section with icons for various 3D software tools like 3D Annotation Insight, 3D Markup, 3D Drive, 3D Learn, 3D Play, 3D Search, 3D Space, 3D Swym, 3D Swym Content, Bookmark Editor, CAD Data Processor Monitoring, Change Action, and Classify & Reuse. The top of the dashboard also has tabs for "Home", "Learning Catalog", and "Favorites".

Learning Experience Title	Learning Paths	Learning Modules
Learning Experience for Electrical 3D Systems Designer	1	50
Learning Experience for Fluid 3D Systems Designer	1	47
Learning Experience for Mechanical Designer	5	44
Learning Experience for Creative Designer	2	32
Learning Experience for Function Driven Generative Designer	1	32
Learning Experience for Mold & Tooling Designer	0	30
Learning Experience for NC Prismatic Machine Programmer	2	19
Learning Experience for Structural Mechanics Engineer	1	18
Learning Experience for Durability and Mechanics Engineer	1	17
Learning Experience for Collaborative Industry Innovation	1	14
Learning Experience for NC Milling Machine Programmer	1	12
Learning Experience for NC Mold & Die Programmer	1	10
Learning Experience for Fluid Dynamics Engineer	1	10
Learning Experience for Collaborative Business Innovation	1	10
Learning Experience for 3D Tolerancing & Annotation Designer	1	10
Learning Experience for Electromagnetics Engineer	1	9
Learning Experience for NC Prismatic & Mill-Turn Machine Programmer	1	9
Learning Experience for Structural Performance Engineer	1	9
Learning Experience for Simulation Collaborator	1	9
Learning Experience for Change Management	1	9
Learning Experience for Durability Performance Engineer	1	7



Промоция 3DEXPERIENCE Works Simulation Adoption

3DEXPERIENCE | 3DDashboard ДиТра среща

Search DiTra_test

Penko Angelov
DiTra_test

ME COMPANY WORLD

Search

3DLearn

Home Learning Catalog Favorites

Learning Catalog \ 3DEXPERIENCE WORKS Library

Menu

Automatic Time Incrementation in Implicit Dynamics (4/5)

L7.10

- Half-increment residual tolerance
 - The half-increment residual tolerance is the solution residual (or out-of-balance force) at the midpoint of an increment.

Seek to control the residual at an intermediate point.

The model is in equilibrium at the beginning and end of the increment.

- The residual at $\Delta t/2$ is evaluated from solutions at the beginning and the end of the increment (inexpensive calculation).
- The half-increment residual tolerance is used to control the accuracy of the HHT integration method.
 - A default value is automatically calculated to balance accuracy and efficiency.

Learning Experience for Function Generative Designer

Learning Path 32 Learning Modules

Learning Experience for Mold & Tooling Designer

Learning Path 30 Learning Modules

Learning Experience for NC Prismatic Machine Programmer

Learning Path 19 Learning Modules

Learning Experience for NC Mold Programmer

Learning Path 10 Learning Modules

Learning Experience for Fluid Dynamics Engineer

Learning Path 10 Learning Modules

Learning Experience for Collaborative Business Innovation

Learning Path 10 Learning Modules

Learning Experience for Simulation Operator

Learning Path 9 Learning Modules

Learning Experience for Change Management

Learning Path 9 Learning Modules

Learning Experience for Durability Performance Engineer

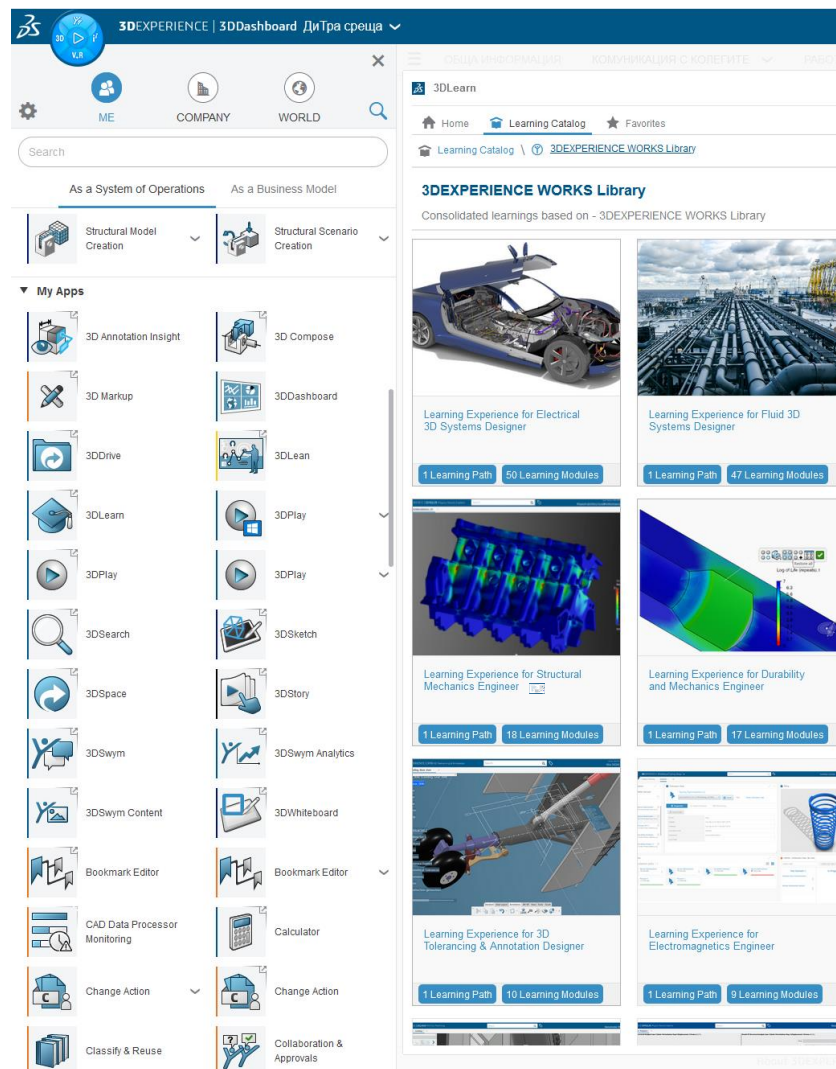
Learning Path 7 Learning Modules

Classify & Reuse

Collaboration & Approvals



Промоция 3DEXPERIENCE Works Simulation Adoption



Menu

Workshop 3a: Analysis of a Reinforced Panel (14/24)

W3a.20

Visualize stress values at different section point locations (cont'd)

- c. Switch to the **Rendering** tab.
- d. In the **Rendering** tab:
 - i. Choose **Mesh** as the visible edge.
 - ii. Choose **Thick** as the shell style to render the shell thickness.
- e. Click **OK**.

Von Mises Stress.1 (N_m2)

1.99e+8
1.79e+8
1.59e+8
1.39e+8
1.19e+8
9.95e+7
7.96e+7
5.97e+7
3.98e+7
1.99e+7
2.78e+4

Top & Bottom
Deformation scale: 18

Contour Plot

Name: Von Mises.1

Edges

Visible edges: Mesh **i**

Shells

Shell style: Thick **ii**

Thickness data source: Section

Thickness scale factor: 1.00

OK Apply Close

< PREV NEXT >



Промоция 3DEXPERIENCE Works Simulation Adoption

3DEXPERIENCE | 3DDashboard ДиТра среща

3DLearn

Learning Catalog

3DEXPERIENCE WORKS Library

Consolidated learnings based on - 3DEXPERIENCE WORKS Library

My Apps

- 3D Annotation Insight
- 3D Compose
- 3D Markup
- 3DDashboard
- 3DDrive
- 3DLean
- 3DLearn
- 3DPlay
- 3DPlay
- 3DPlay
- 3DSearch
- 3DSketch
- 3DSpace
- 3DStory
- 3DSwym
- 3DSwym Analytics
- 3DSwym Content
- 3DWhiteboard
- Bookmark Editor
- Bookmark Editor
- CAD Data Processor Monitoring
- Calculator
- Change Action
- Change Action
- Classify & Reuse
- Collaboration & Approvals

Workshop 6: Vibrating Cantilevered Plate (24/25)

Plot the tip displacement history.

- Create another **X-Y Plot from History** plot:
 - Select **U** as the output variable.
 - Select **Vector Component 3** as the quantity.
 - Select **release_tip** as the step.
 - Select **tip** as the region.
 - Select either node as the sub-region.
 - Toggle on the **Deactivate existing history plots** option.
 - Click **Apply**.

X-Y Plot from History

Name: X-Y Plot from History U.1

Values

Variable: U, Translations and rotations

Quantity: Vector Component 3

Scope

Step: release_tip (Time)

Support: tip

X-axis

Source: Time

☒ Deactivate existing X-Y plots

Apply Close

Annotations: 1a, 1b, 1c, 1d, 1e

X-Y Plots Viewer

Displacement (mm)

Time (s)

X-Y Plot from History U.1/U/C3/tip/3

Region and sub-region selection

Filter: 2/2

Selection

☒ Whole model

☒ tip

☐ Node 3

☐ Node 4

Annotations: 1d, 1e



Промоция 3DEXPERIENCE Works Simulation Adoption



Workshop 3: Brake Squeal Analysis (23/28)

W3.27

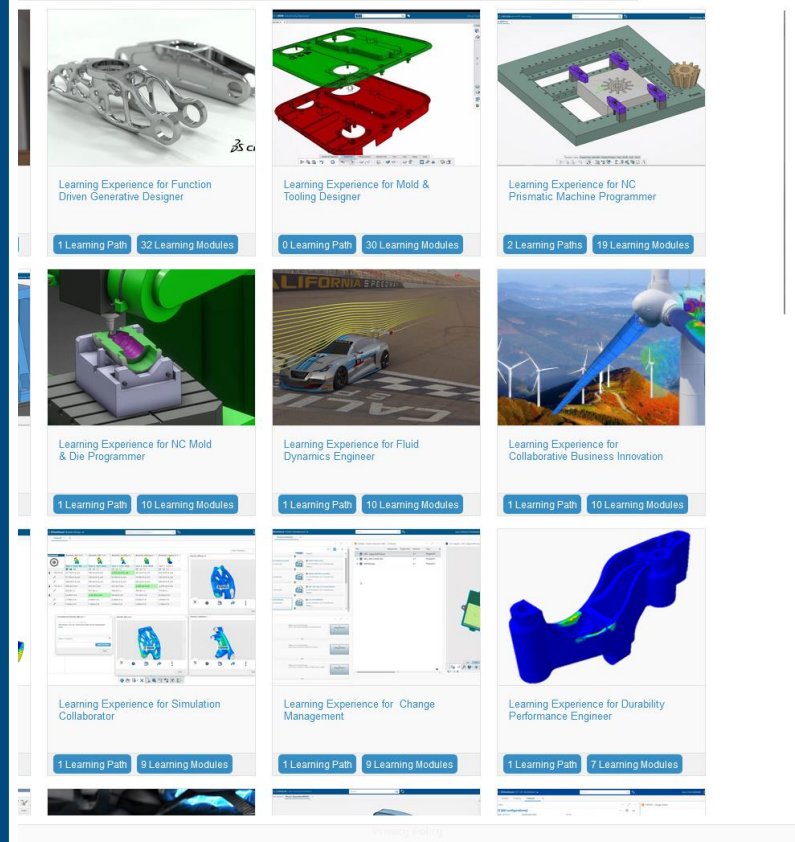
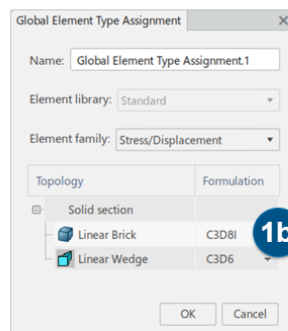
Assign the element type

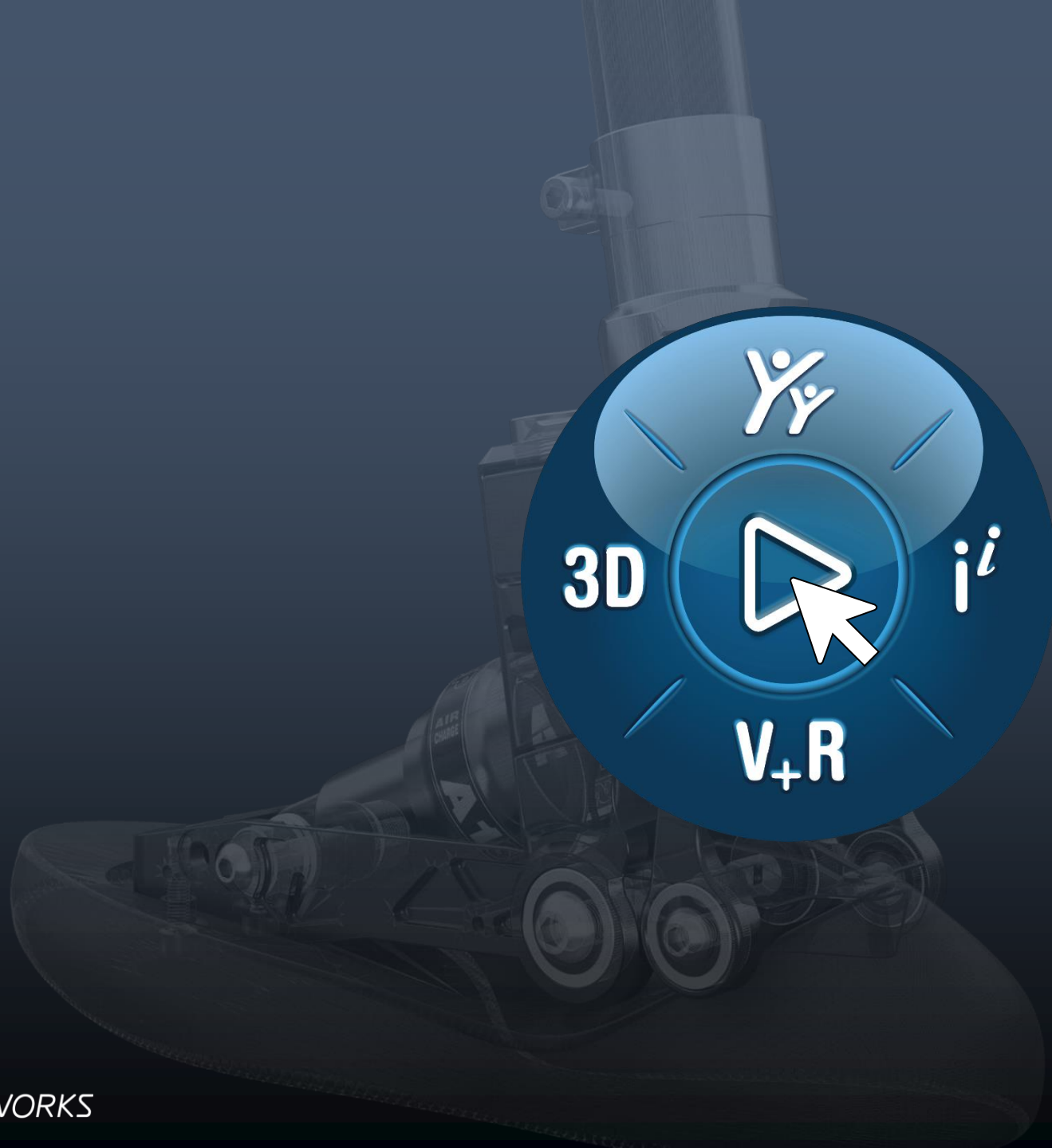
1. Right-click anywhere to select **Feature Manager**.
 - a. Double-click **Global Element Type Assignment**.
 - b. Set the element formulation for the **Linear Brick** topology to **C3D8I**.



Use the **Feature Manager** to check that all of the loads and restraints are defined correctly, before proceeding, then close the **Feature Manager**.

In...	VI	Name	Type	Category	Definition	Static Step.1	Static Step.2	Frequency St...	Complex Fre...
☒		Fixed Displacement.1	Fixed Displacement	Restraints	Translation X, Tr...				
☒		Fixed Displacement.2	Fixed Displacement	Restraints	Translation X, Tr...				
☒		Fixed Displacement.3	Fixed Displacement	Restraints	Translation X, Tr...				
☒		Global Element Type Assignment.1	Global	Element Type Ass...					
☒		Global Virtual Bolt Output.1	Global Virtual Bolt O...	Output Requests	Field and History				
☒		Output.1	Field	Output Requests	Field				
☒		Output.2	History	Output Requests	History				
☒		Output.3	Field	Output Requests	Field				
☒		Output.4	Field	Output Requests	Field				
☒		PAD_ROTATOR	Contact Property	Interactions					
☒		Pressure.1	Pressure	Loads	500000 N_m2				
☒		Pressure.2	Pressure	Loads	500000 N_m2				
☒		Sliding Velocity.1	Sliding Velocity	Loads	47.746 turn_mn				
☒		Surface-based Contact.1	Surface-based Contact	Interactions	PAD_ROTATOR				
☒		Surface-based Contact.2	Surface-based Contact	Interactions	PAD_ROTATOR				
☒		Surface-based Contact.3	Surface-based Contact	Interactions	PAD_ROTATOR				
☒		Surface-based Contact.4	Surface-based Contact	Interactions	PAD_ROTATOR				
☒		Tangential Behavior Override.1	Tangential Behavior ...	Interactions	PAD_ROTATOR				







Благодарим за вниманието!

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