



New Paradigm of CAE,

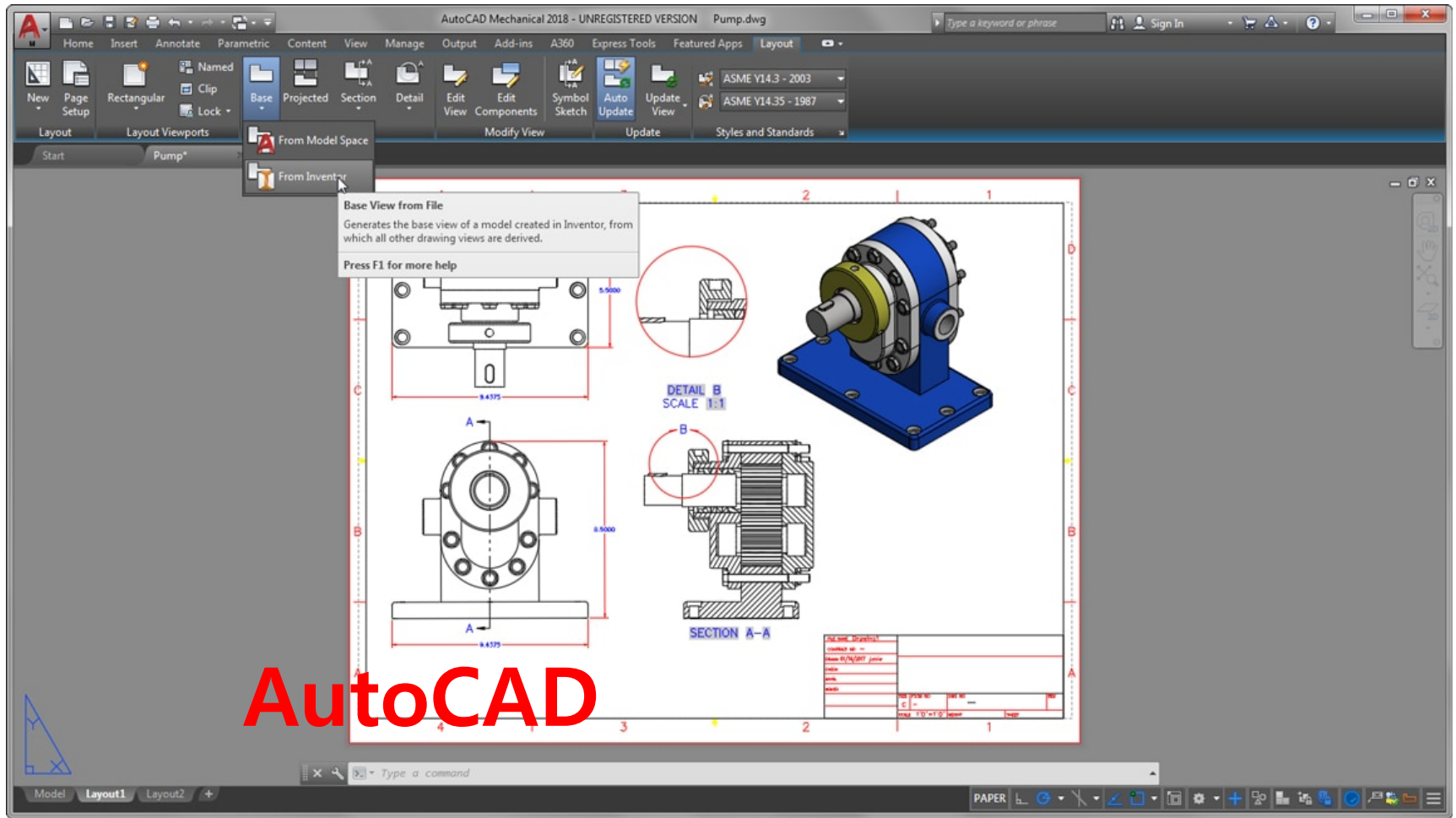
分析!! 沒有學不會的!!

MeshFree免網格分析軟體

台灣邁達斯
翁嘉駿

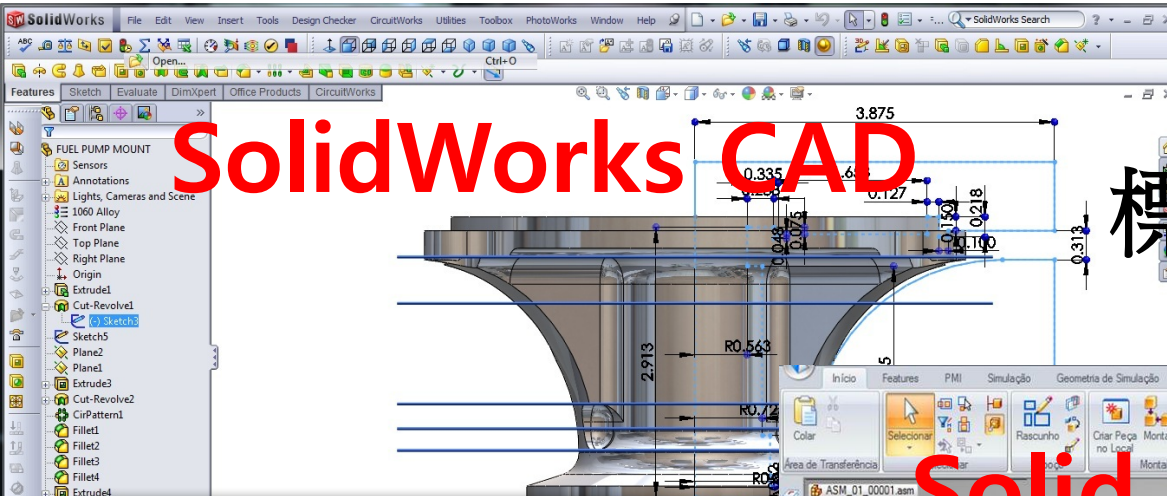
jim.weng@midasuser.com.tw

2D 繪圖軟體

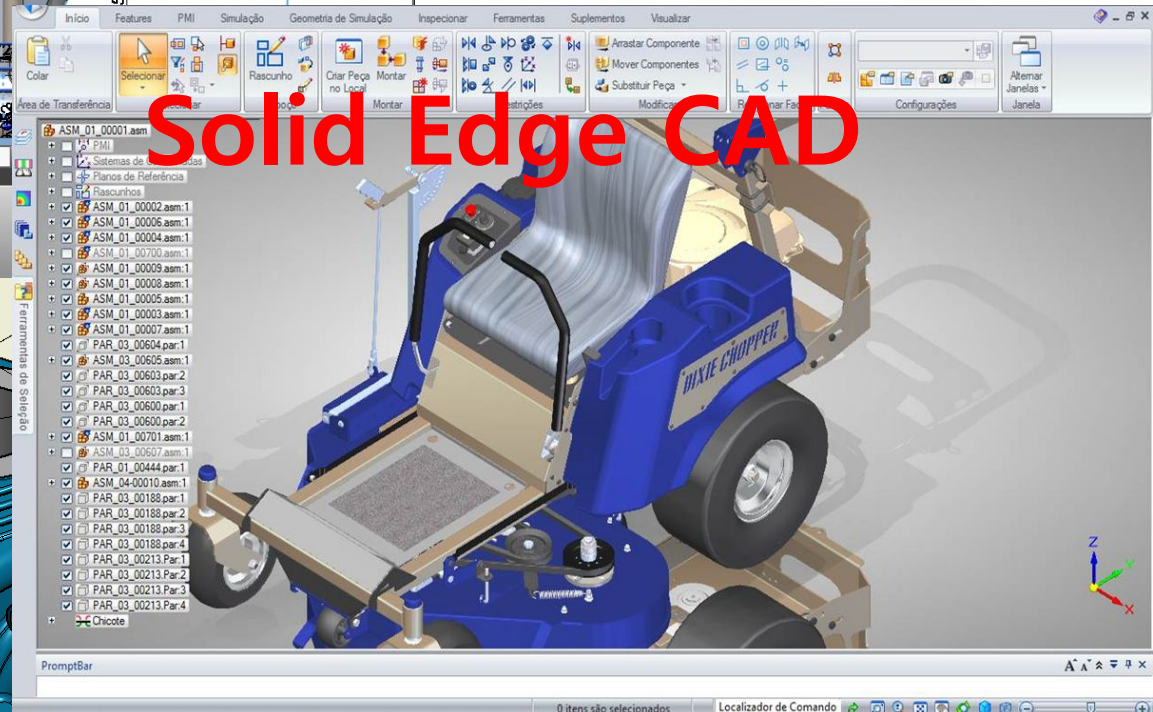


SolidWorks CAD

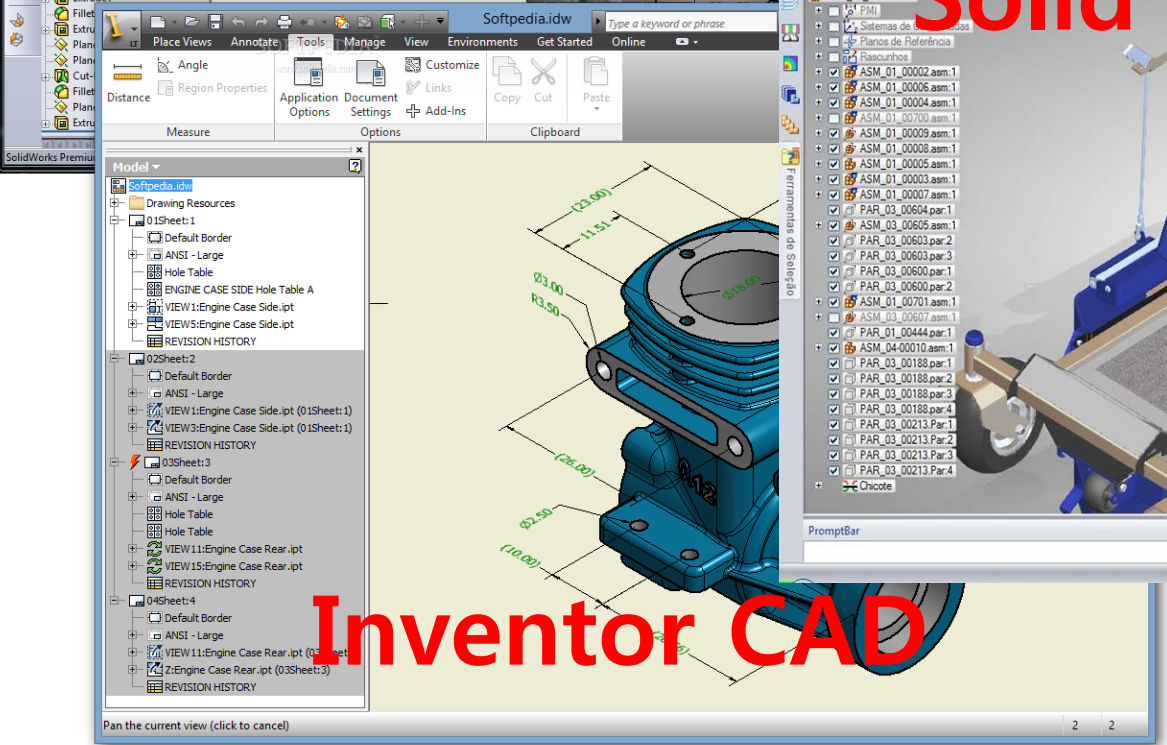
標準 3D 繪圖軟體



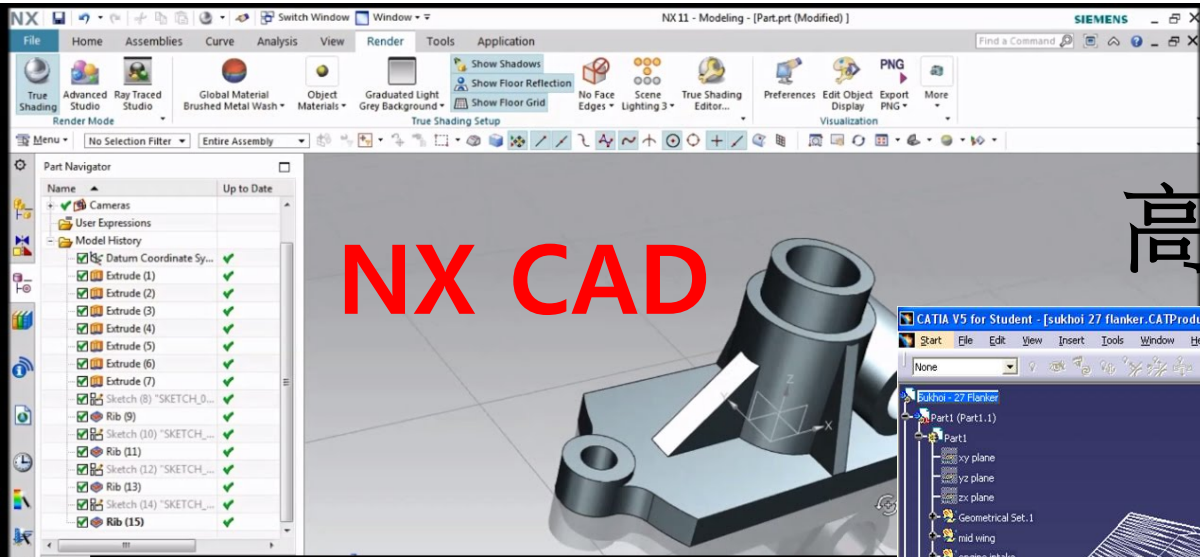
Solid Edge CAD



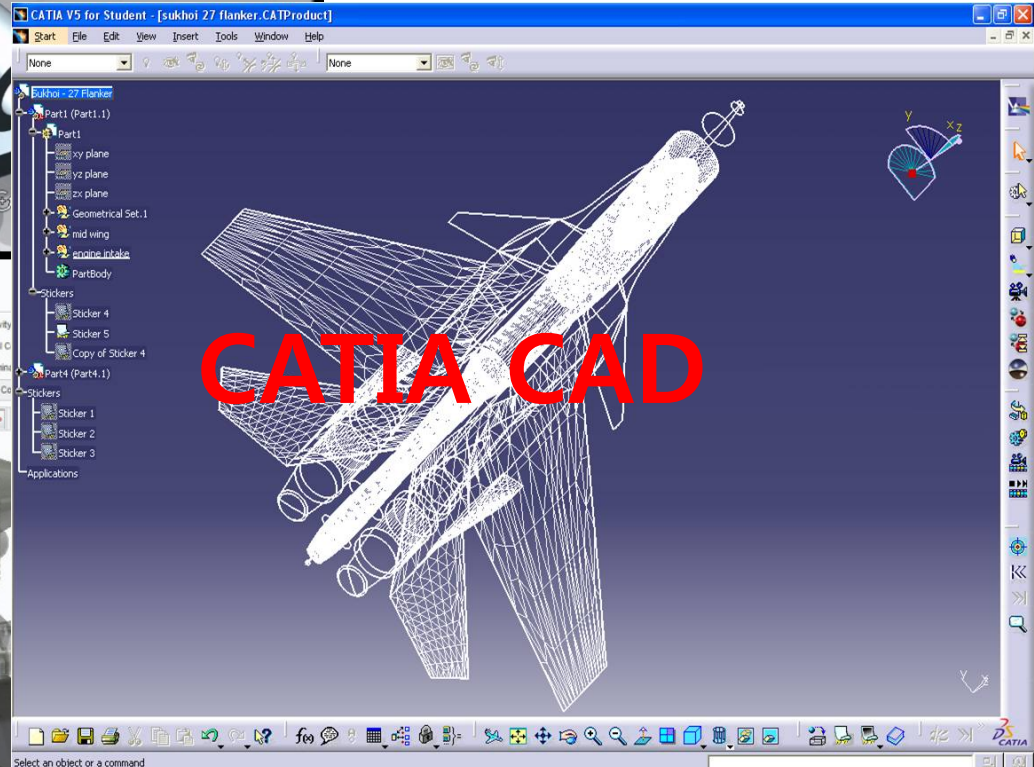
Inventor CAD



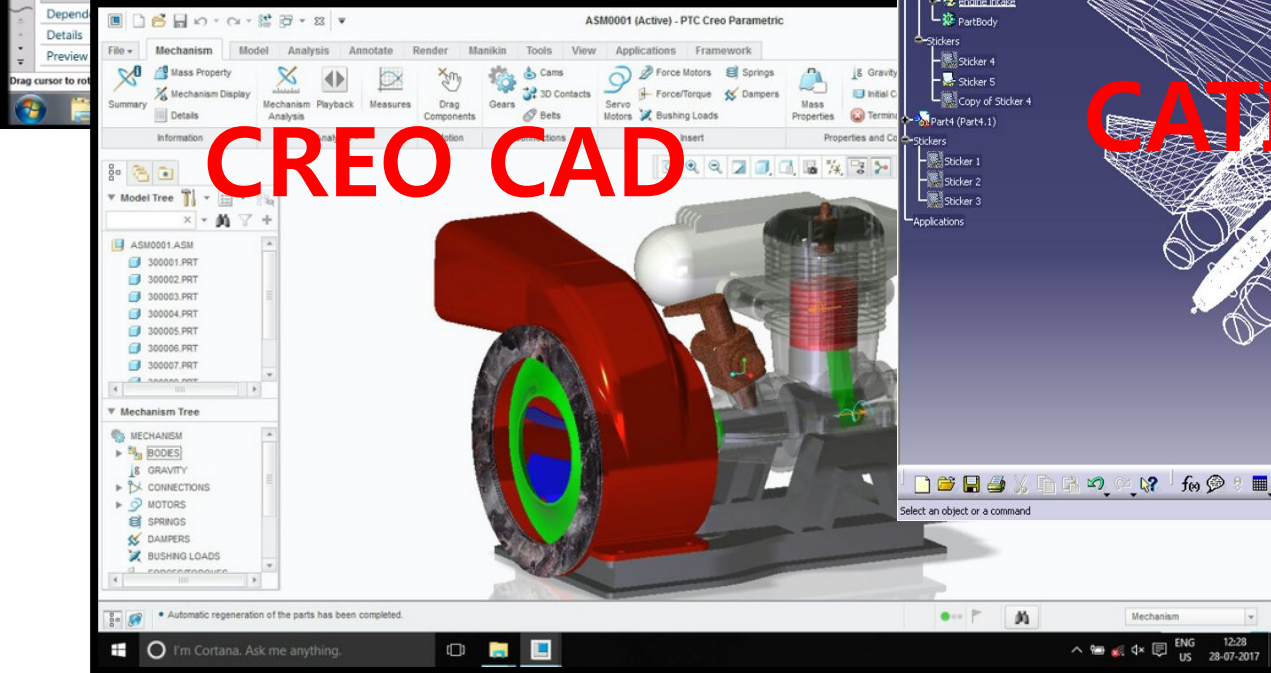
高階3D 繪圖軟體



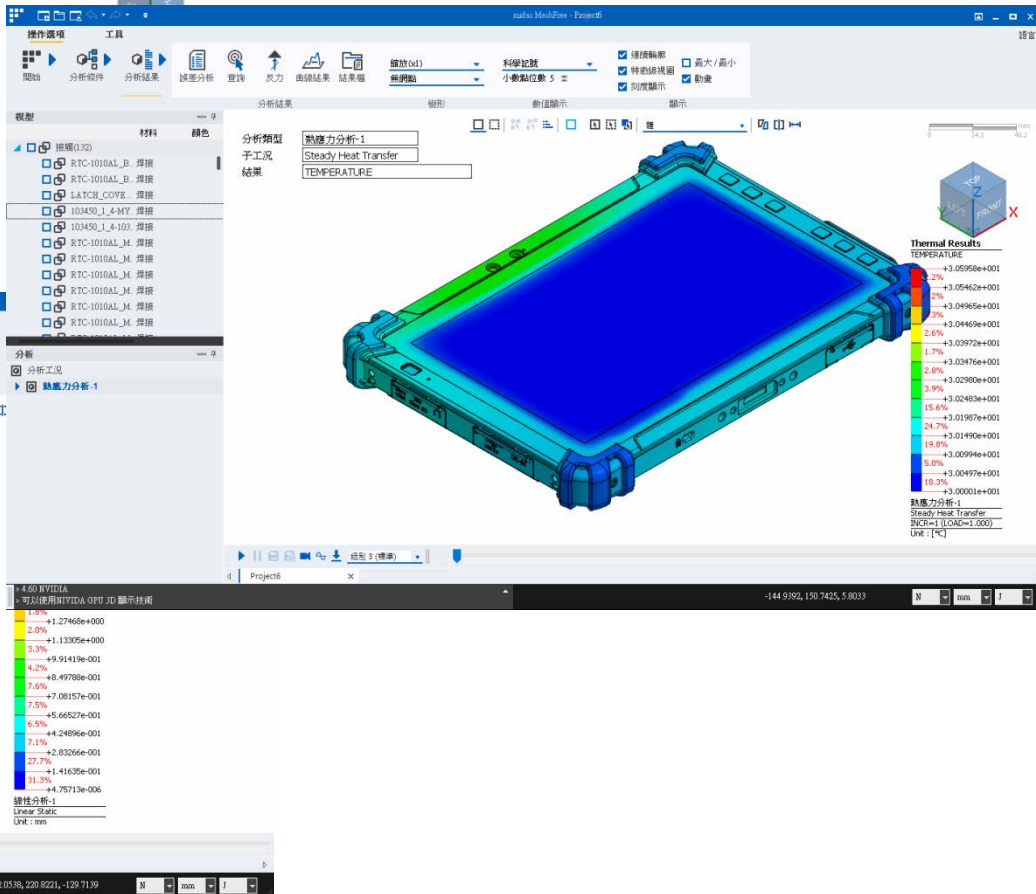
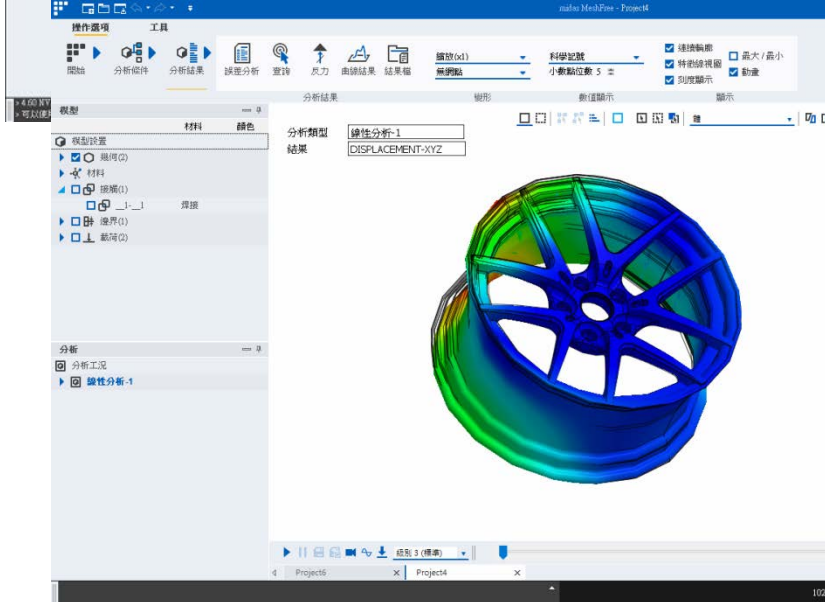
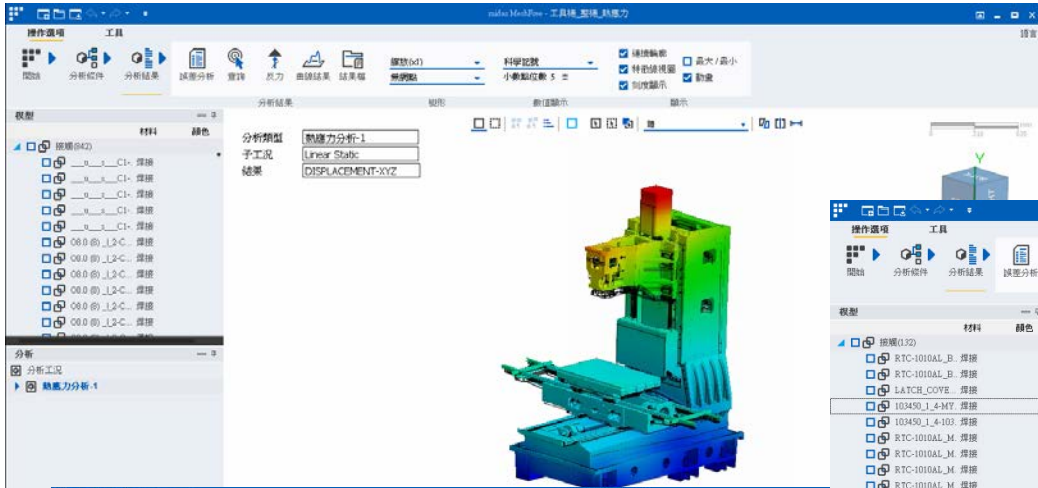
NX CAD



CATIA CAD



CREO CAD

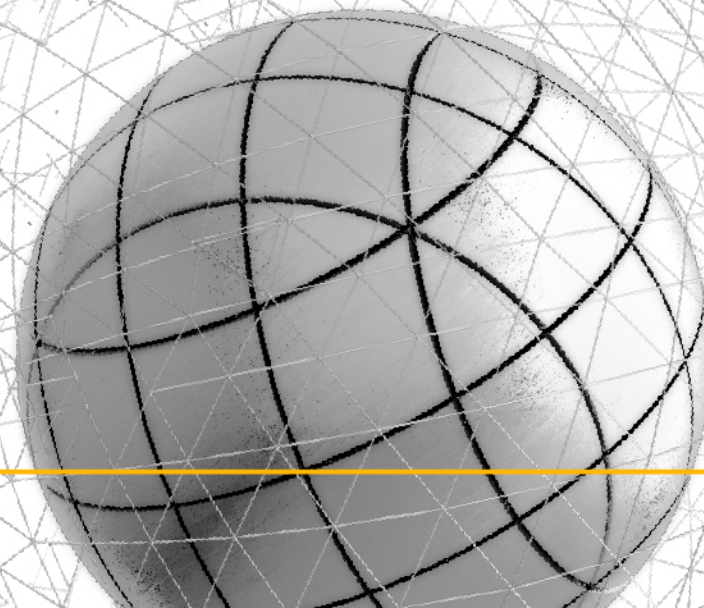


比 3D 繪圖軟體還簡單的分析軟體



單件-托架結構分析

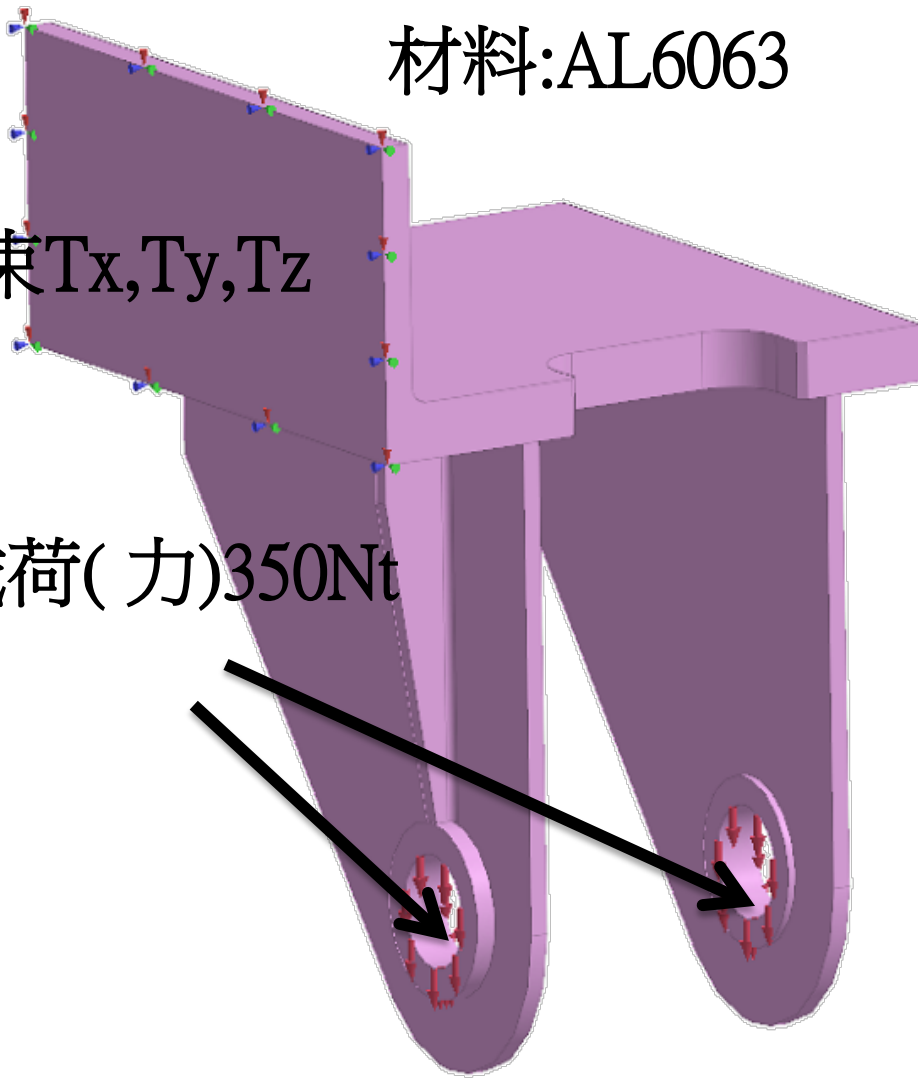
Simple, but Everything.



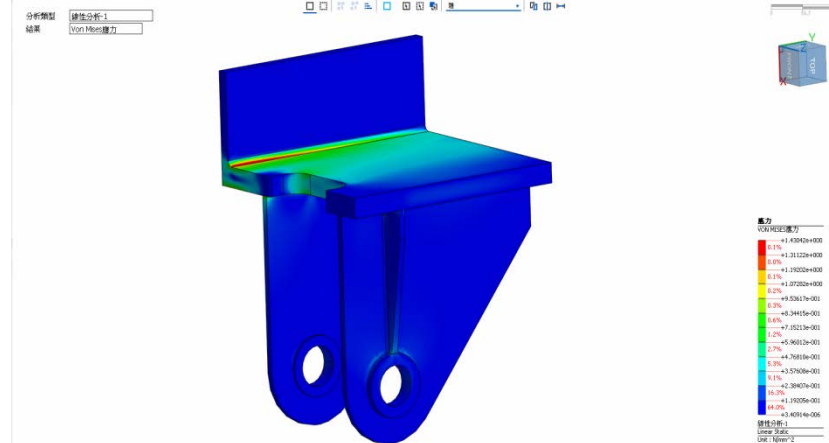
材料:AL6063

拘束Tx,Ty,Tz

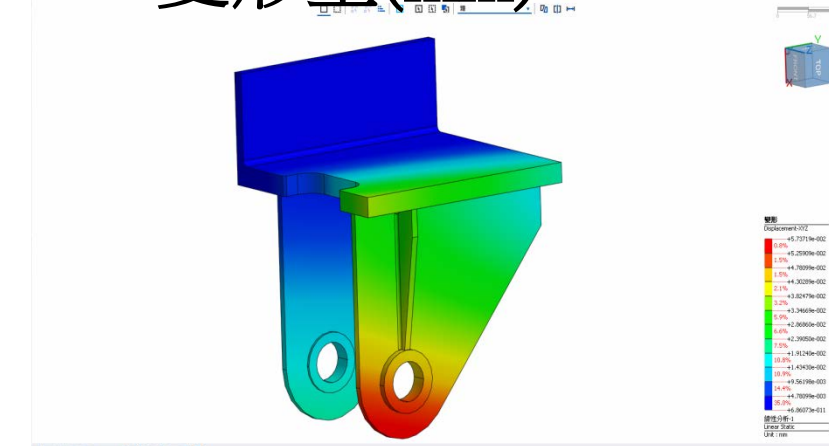
載荷(力)350Nt



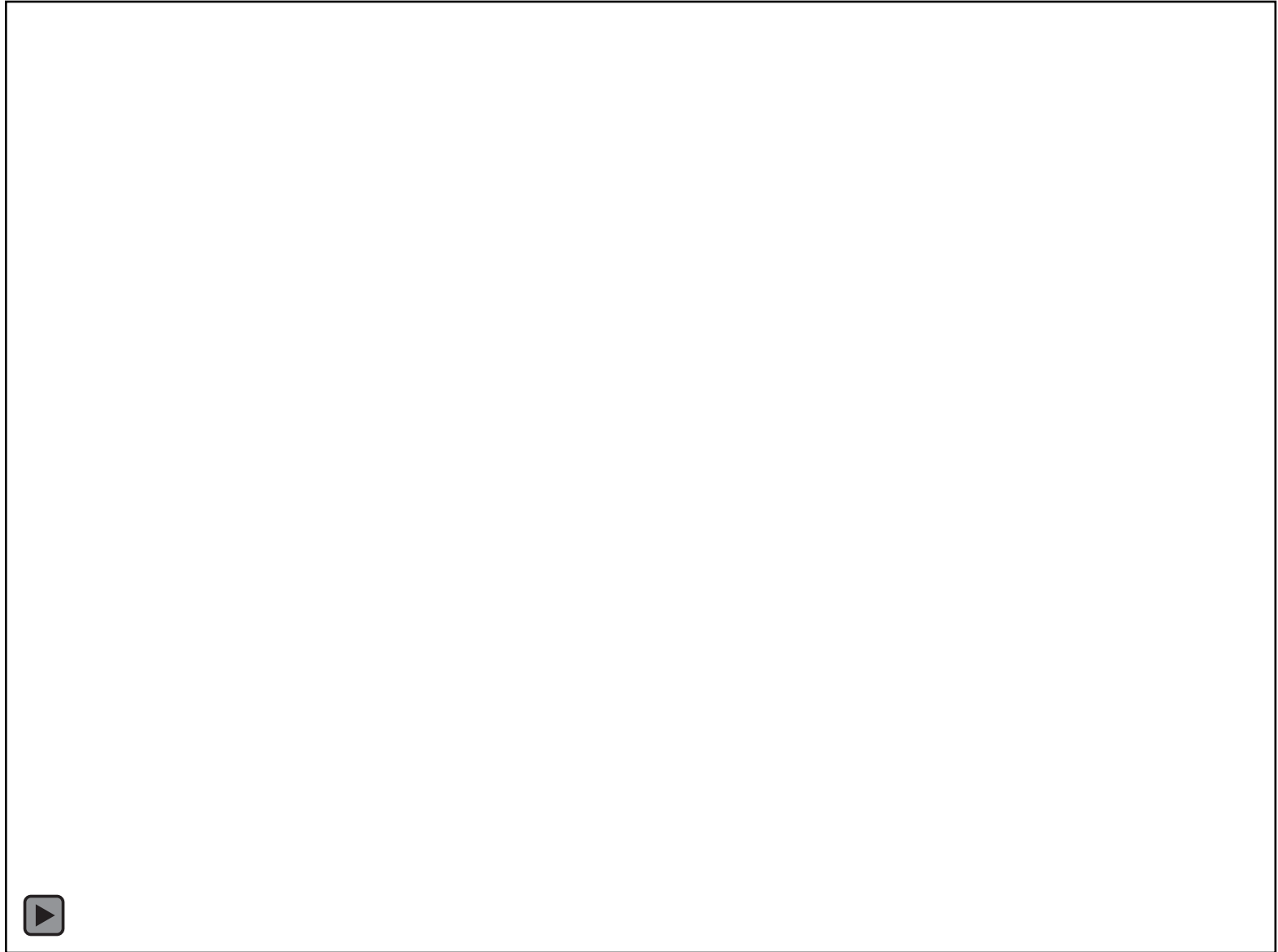
應力(MPa)



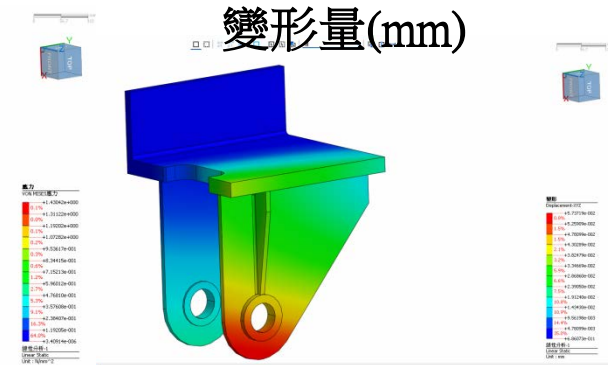
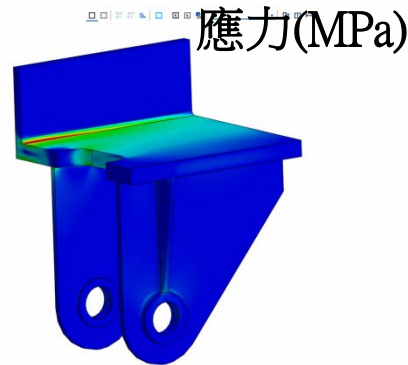
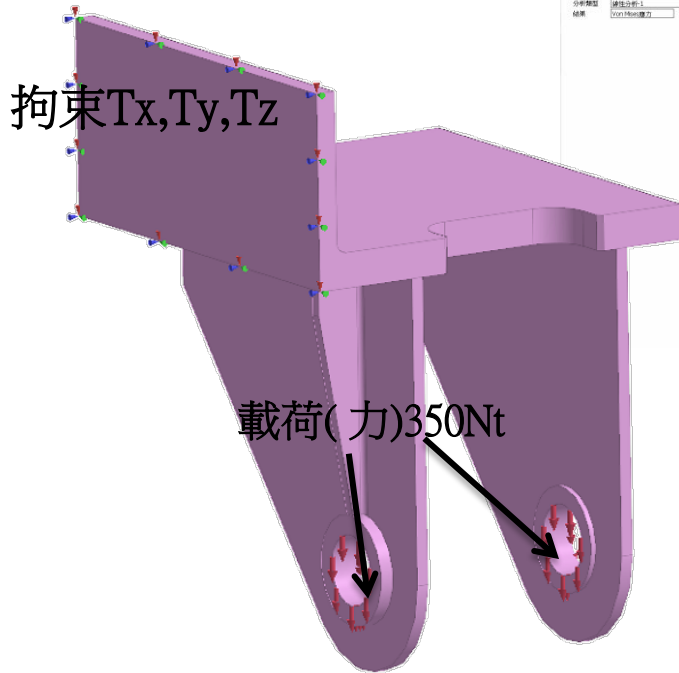
變形量(mm)



托架結構分析-操作影片



可靠的分析(MeshFree VS. ANSYS)

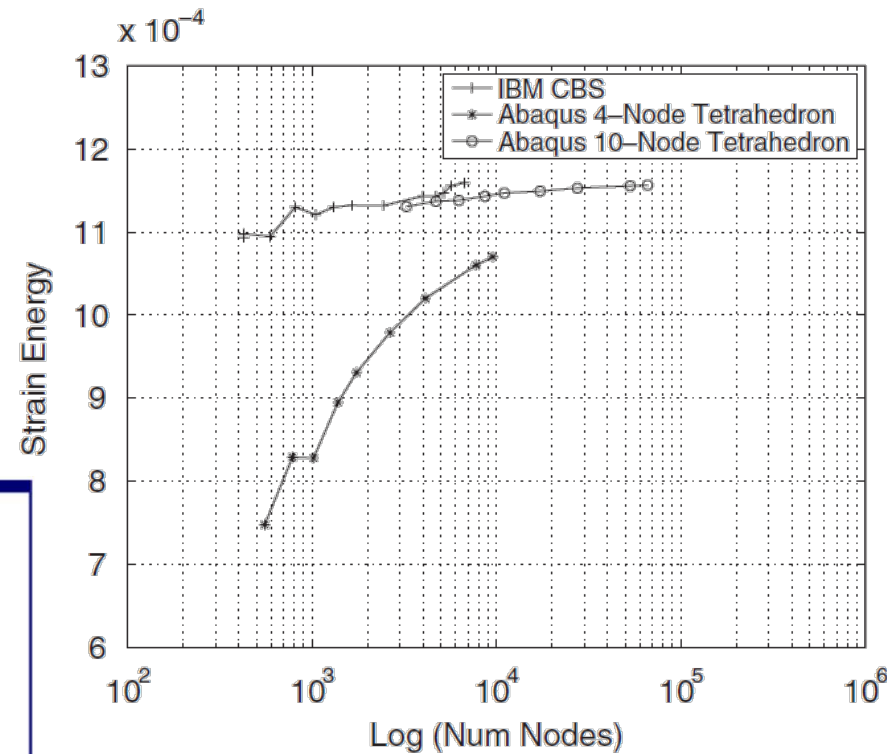
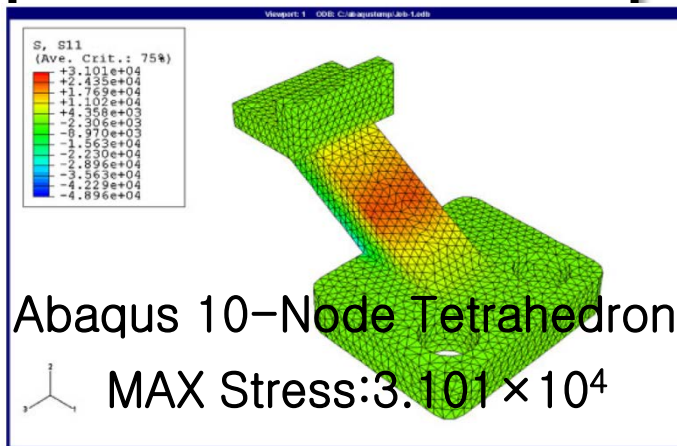
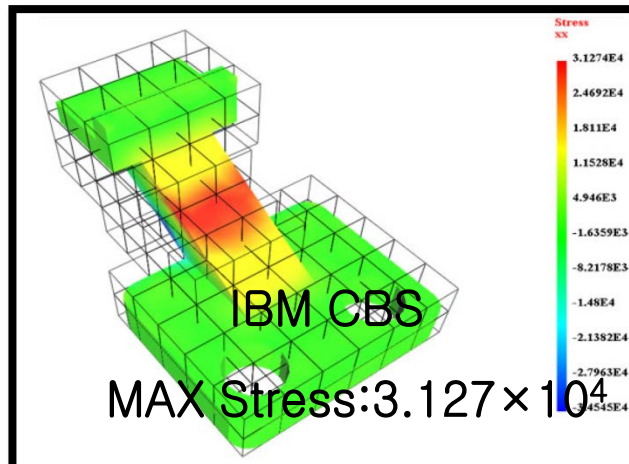
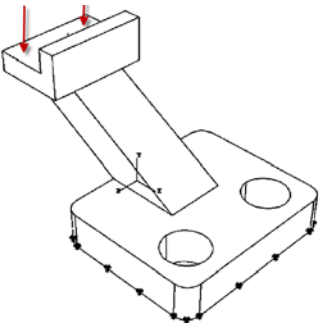


MeshFree VS.ANSYS結果分析對比

軟體 \ 結果	變形/mm	應力/MPa	誤差
MeshFree	0.0395	2.922	變形: 4.3%
ANSYS	0.0413	3.049	應力: 4.1%

可靠的分析(MeshFree VS. Abaqus)


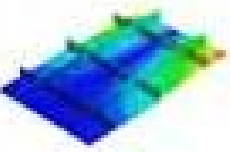


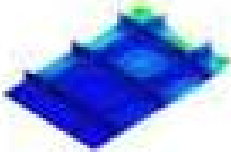

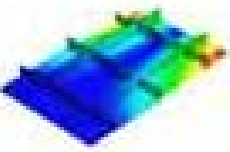
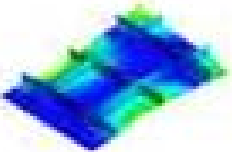

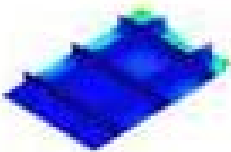
A 3D dial bracket structure-IBM (MeshFree)vs.FEM(Abaqus)



應變能-節點數量收斂比較

參考文獻: Ravi K. Burla and Ashok V. Kumar. Implicit boundary method for analysis using uniform B-spline basis and structured grid. *Int. J. Numer. Meth. Engng* 2008; 76:1993-2028

MIDAS&三星公司共同開發

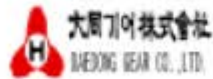
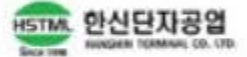
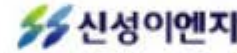
	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5
FEM	 142.5 Hz	 148.6 Hz	 722.5 Hz	 781.5 Hz	 1,003 Hz
midas MeshFree	 142.6 Hz	 148.8 Hz	 717.9 Hz	 777.2 Hz	 995.8 Hz

採用NAFEMS(國際有限元工程師協會)提供的標準模型對MeshFree軟件進行驗證，將計算結果與現有的FEM計算結果進行對比，兩者的誤差在4%以內。

用戶名單



SEMES



FST



三步驟完成分析



STEP1

導入CAD



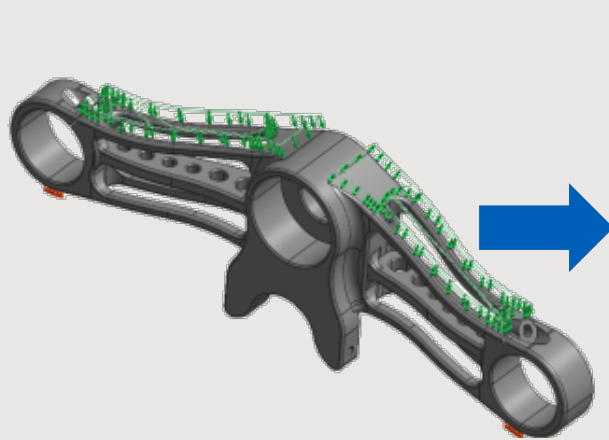
STEP2

輸入荷載和邊界條件

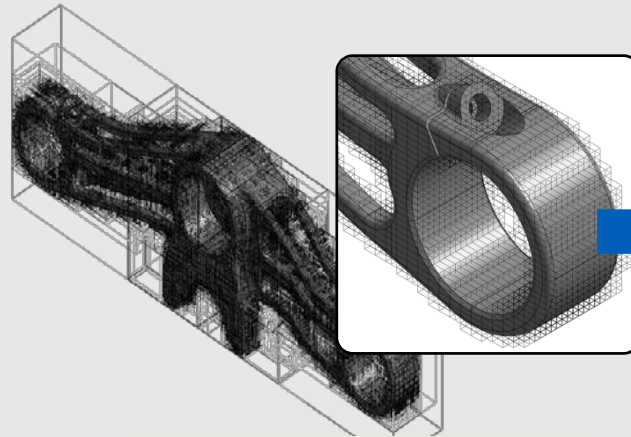


STEP3

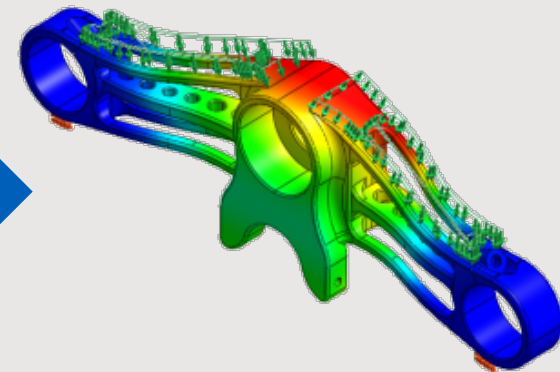
查看分析結果



全中文化&圖形化界面



免網格&直接計算



NVIDIA 3D顯示技術

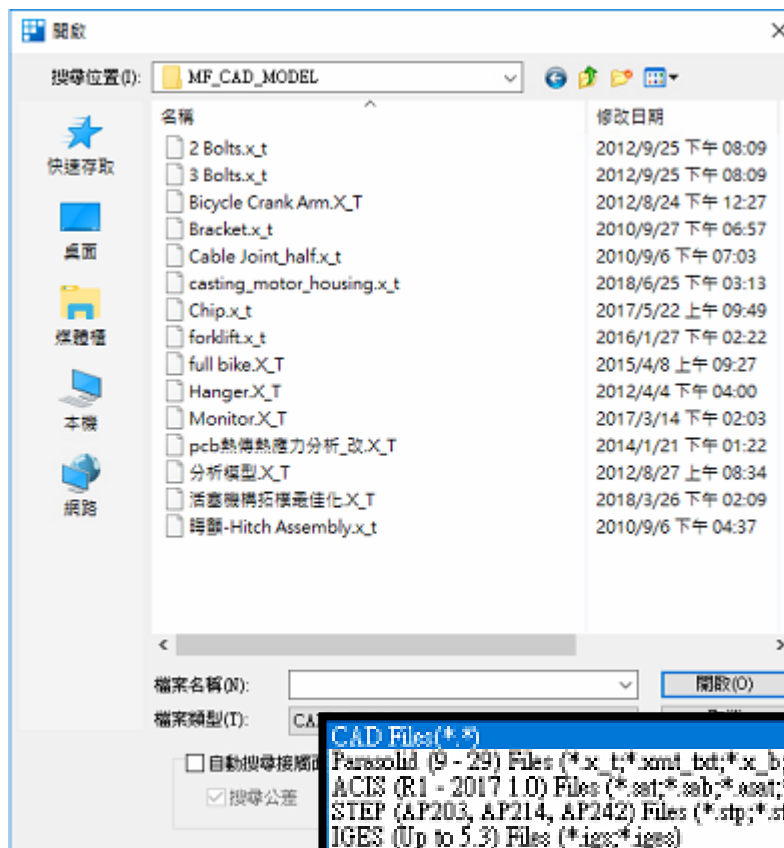
支援標準3D CAD格式

1. 標準CAD格式：

ACIS(*.SAT)、Parasolid
(*.X_T)、STEP(*.STP)、
IGES(*.igs)

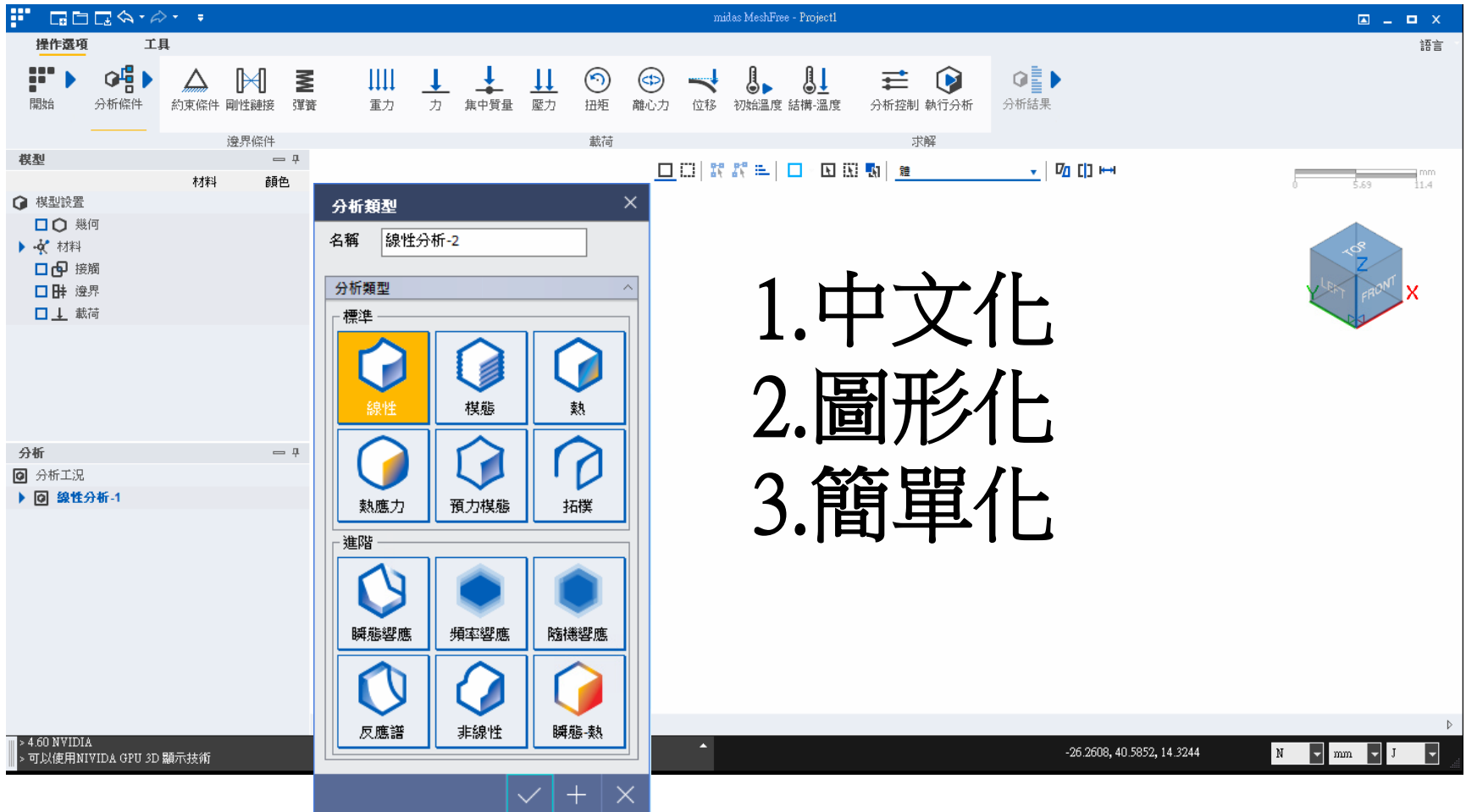
2. 3D CAD各別格式：

SOLIDWORKS(*.SLDPRT)、
PRO/E(.PRT)、CATIA
V4~V5、UG、Inventor、
Solid Edge



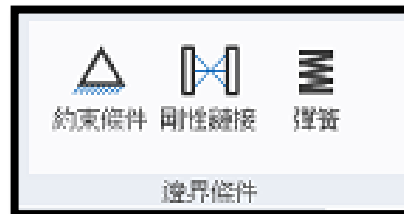
- CAD Files (*.*)
- Parasolid (9 - 29) Files (*.x_t;*.smt_bct;*.x_b;*.smt_bsm)
- ACIS (R1 - 2017 1.0) Files (*.sat;*.sab;*.asat;*.asob)
- STEP (AP203, AP214, AP242) Files (*.stp;*.step)
- IGES (Up to 5.3) Files (*.igs;*.iges)
- Pro-E (16 - Creo 3.0) Files (*.prt;*.prt.*;*.asm;*.asm.*)
- CATIA V4 (CATIA 4.1.9 - 4.2.4) Files (*.model;*.exp;*.session)
- CATIA V5 (V5R8 - V5-6R2016) Files (*.CATPart;*.CATProduct)
- Solid Works (98 - 2017) Files (*.sldprt;*.sldasm)
- Unigraphics (11 - NX11) Files (*.prt)
- Inventor Part (Y6 - Y2017) Files (*.ipt)
- Inventor Assembly (Y11 - Y2017) Files (*.iam)
- Solid Edge (Y18 - ST9) Files (*.par;*.asm;*.pasm)

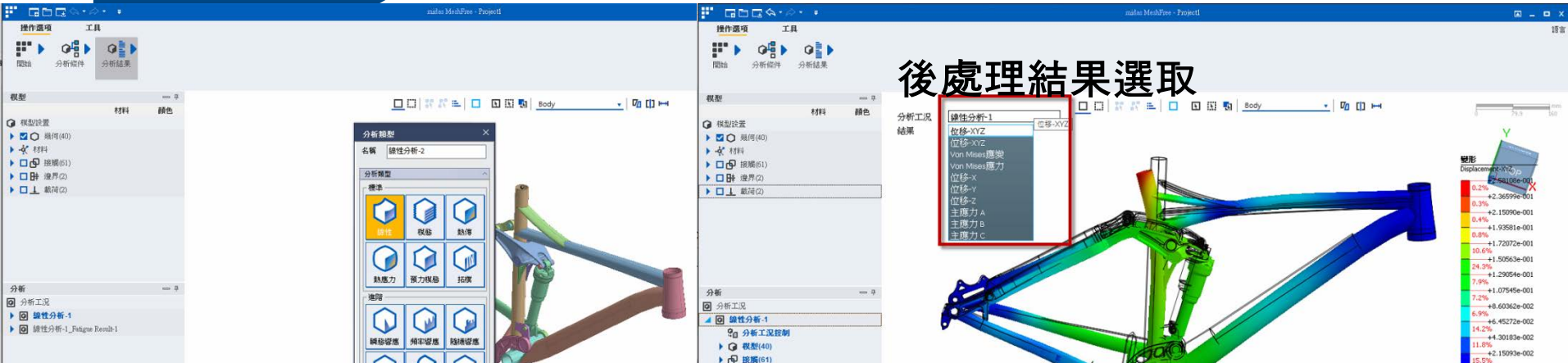
最適合機構工程師的分析軟體



1. 中文化
2. 圖形化
3. 簡單化

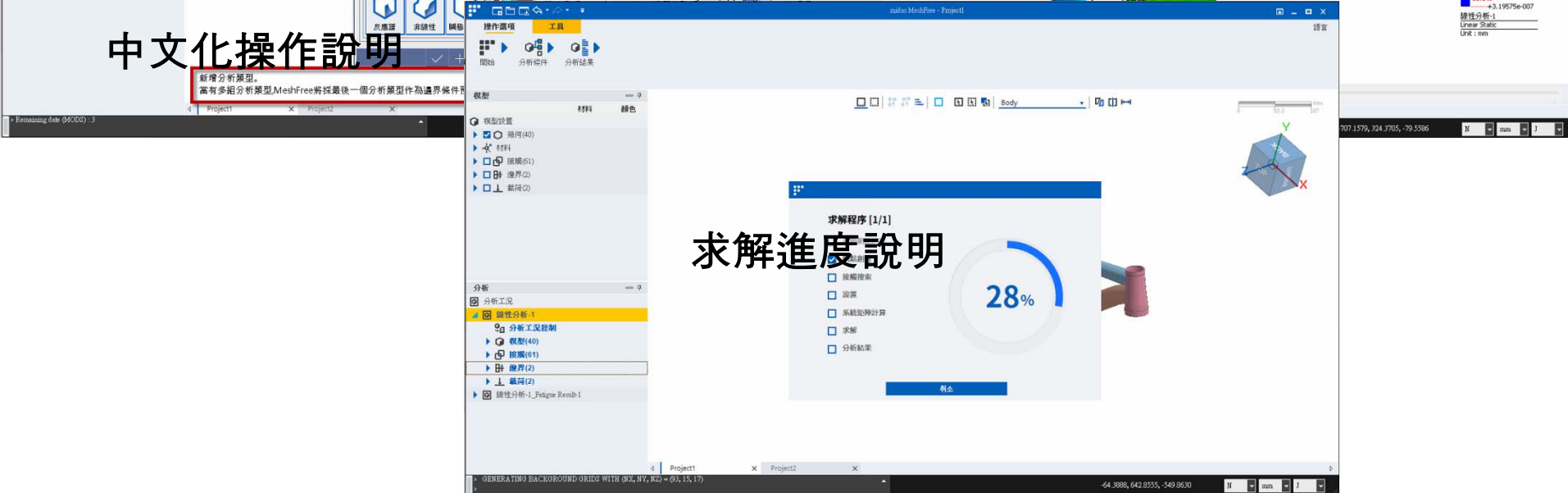
直觀操作



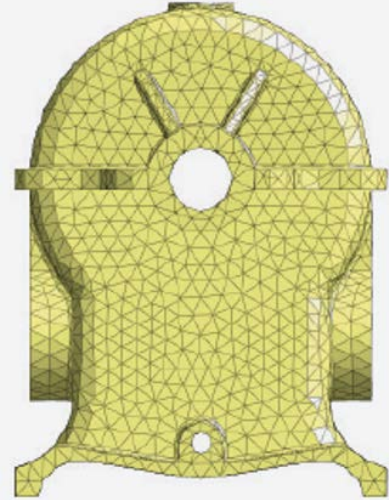


中文化操作說明

新增分析類型。
當有多組分析類型MeshFree將最後一個分析類型作為邊界條件。

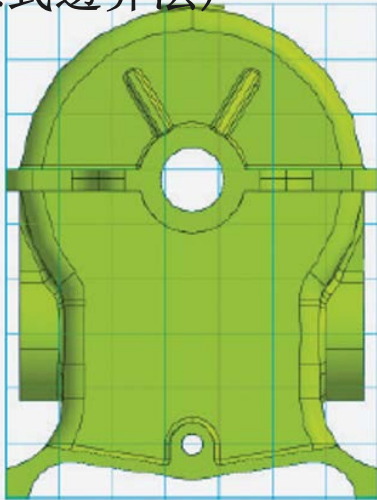


FEA (有限元素法)



- 生成網格時需要考慮模型各種形狀
- 為了生成高品質的網格，需要進行簡化/清理工作。
- 經常會遇到生成網格問題
(無法生成高品質的網格以及自動網格化功能的局限性)

IBM (隱式邊界法)

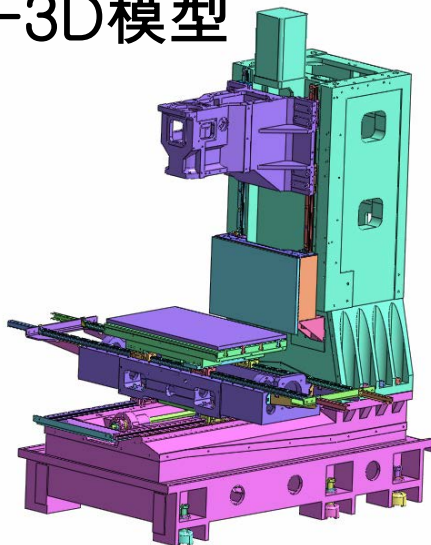


- 直接進行分析
- 不管3D模型有多複雜，照樣可進行分析。
- 省下無效率清理幾何&網格化時間
- 專門為設計人員而開發的革命性設計分析工具

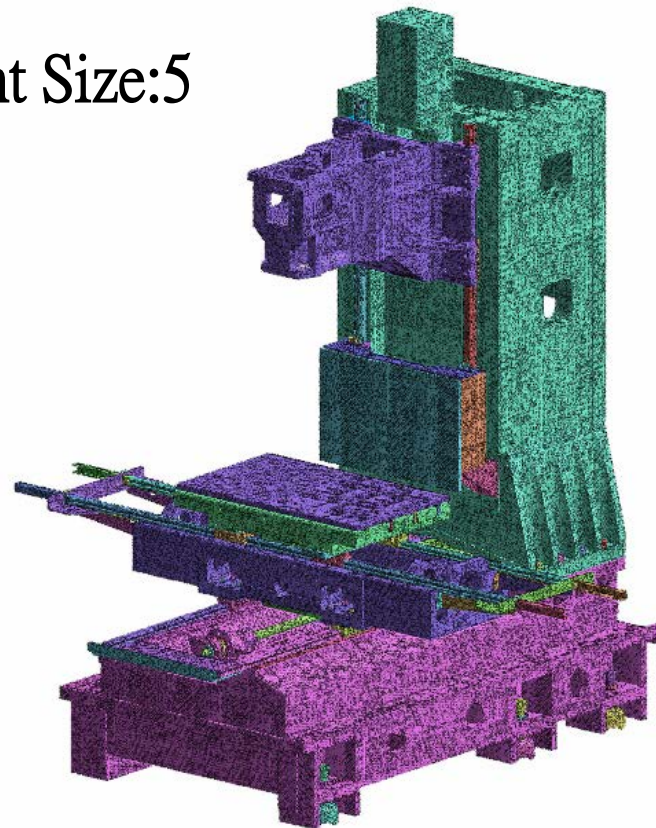
整機-有限元素模型(未清理幾何)



整機-3D模型



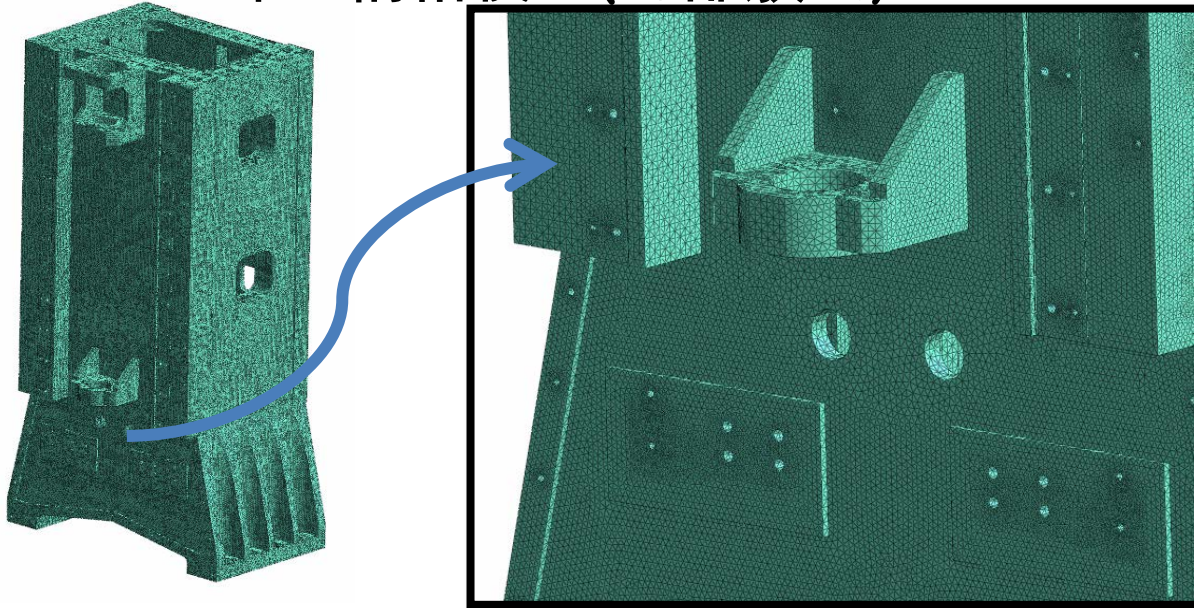
Element Size:5



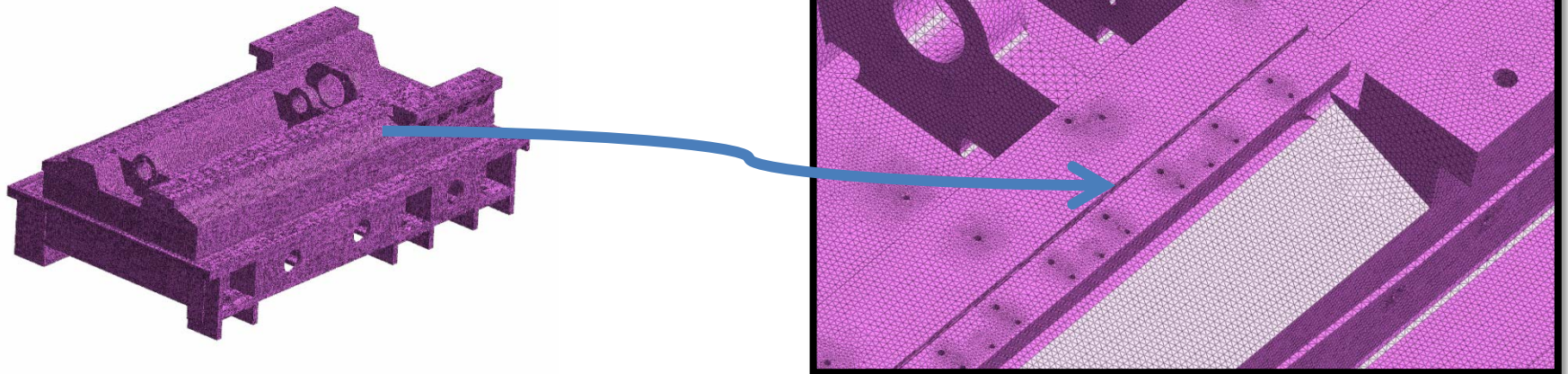
節點/元素數量

G:299 N:24,132,599 E:16,043,669

立柱-網格模型(局部放大)

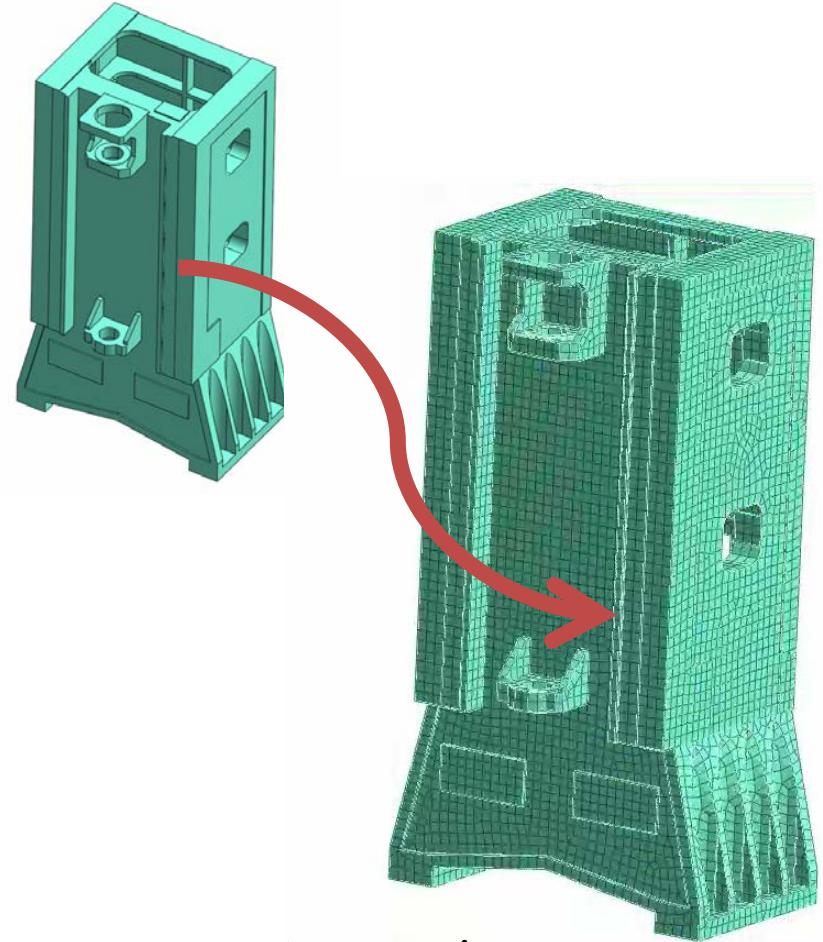
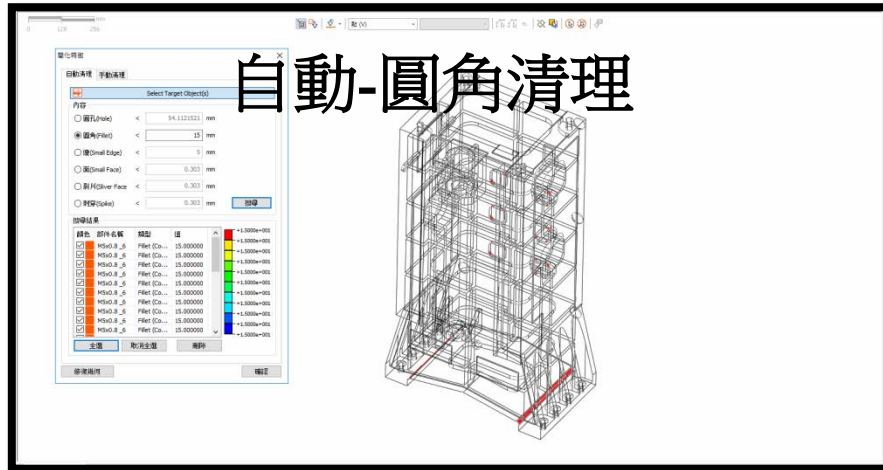
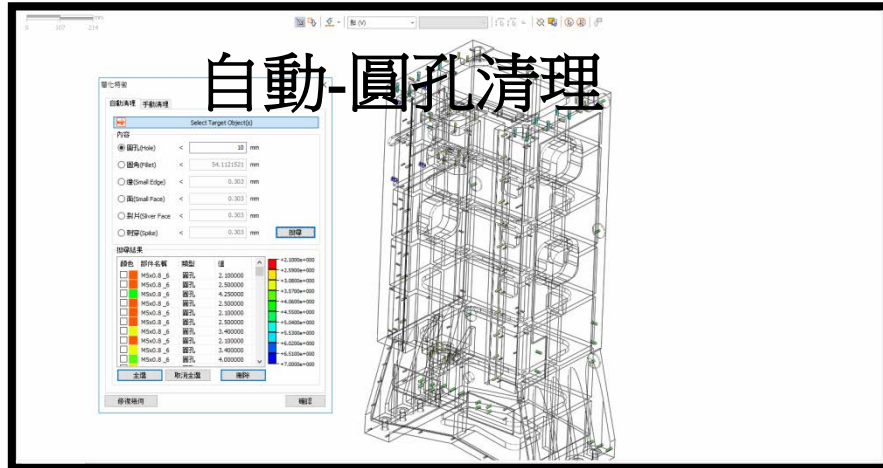


底座-網格模型(局部放大)



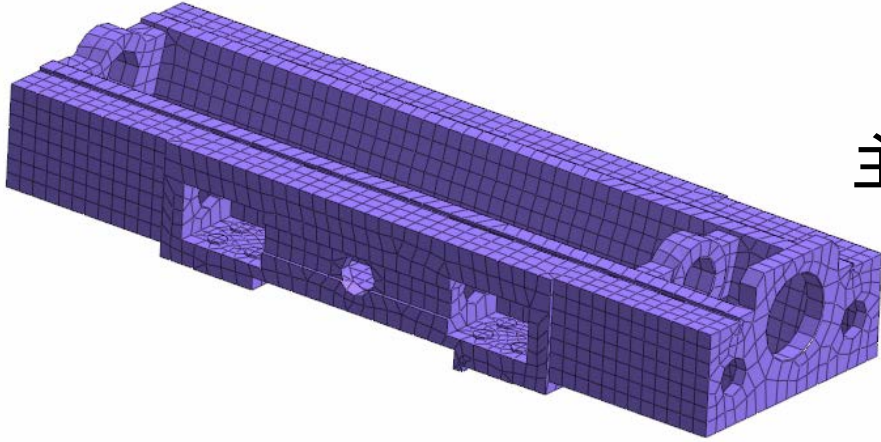
有限元素模型(清理幾何)-1

立柱-3D模型-清理後

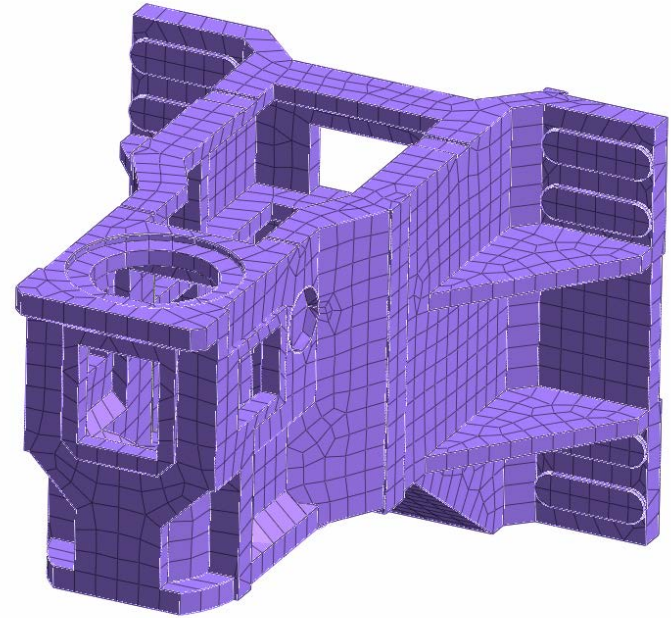


混合網格(六面體+五面體)
www.midasuser.com.tw

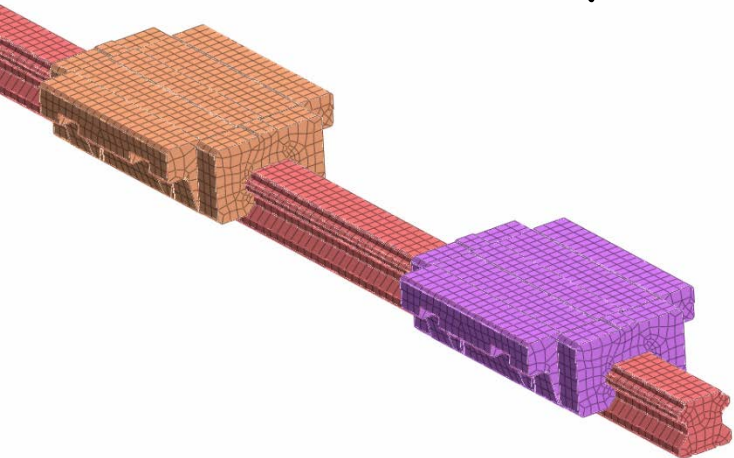
夾具台-混合網格(六面體+五面體)



主軸頭-混合網格(六面體+五面體)



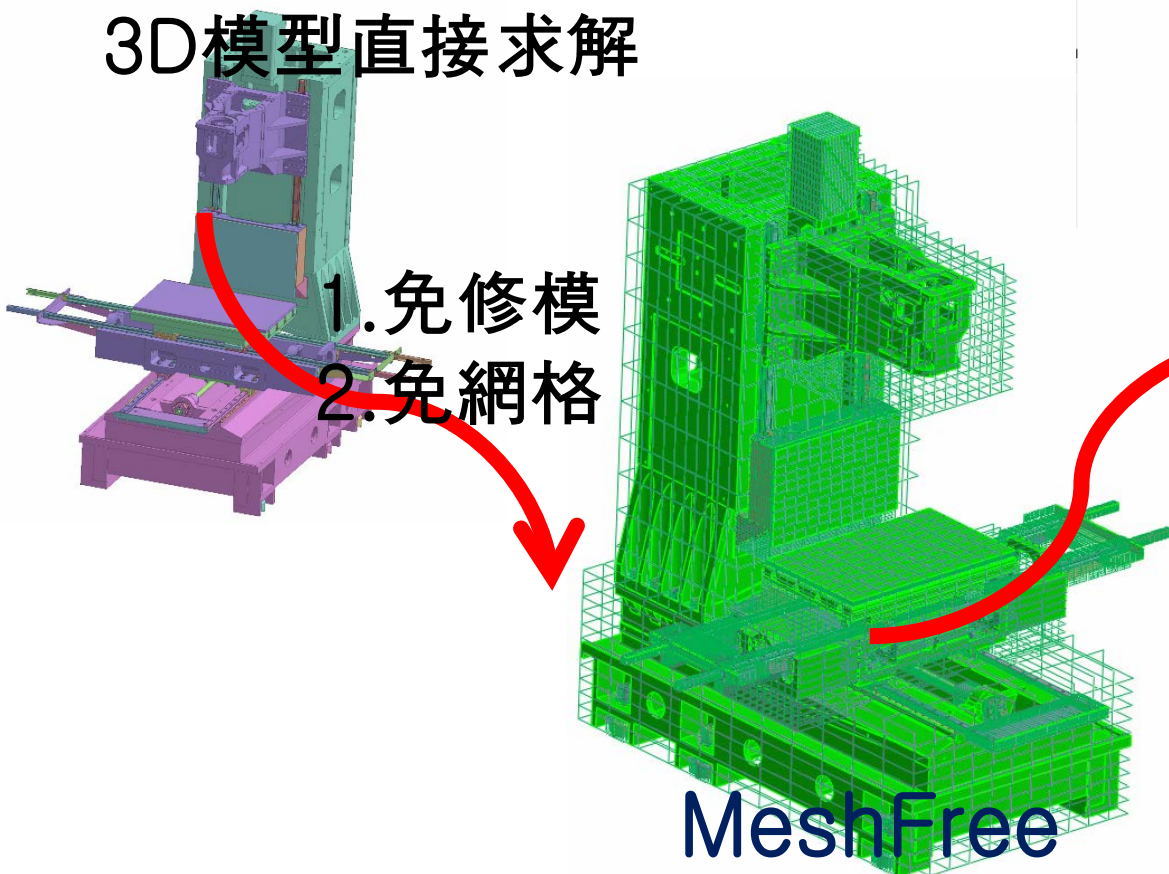
滑軌-混合網格(六面體+五面體)



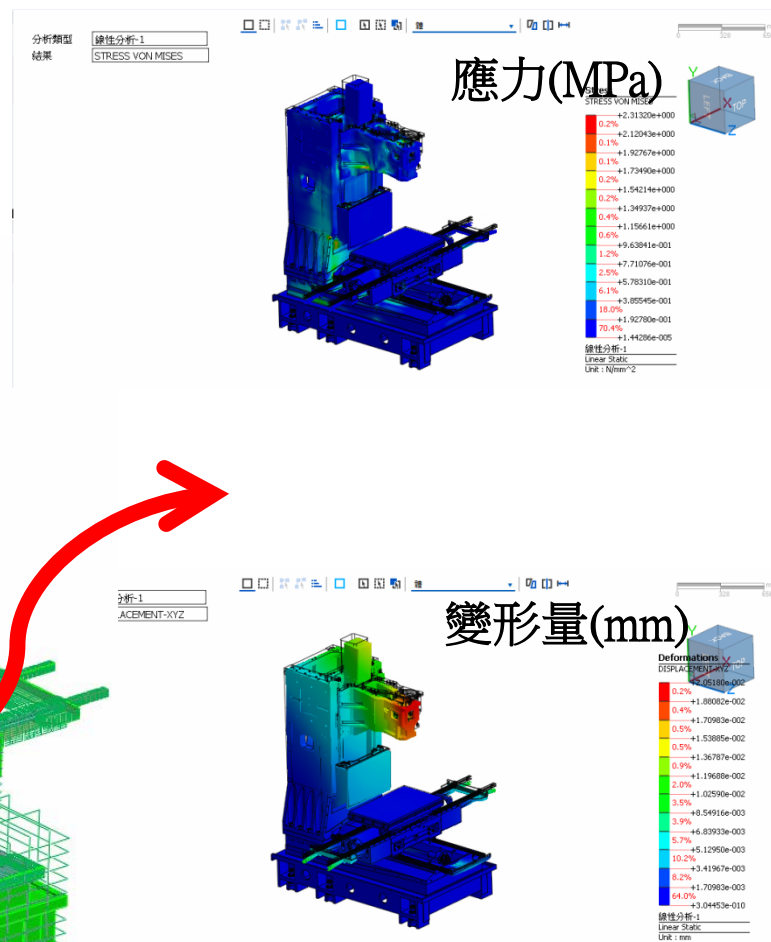
整機分析-免網格

3D模型直接求解

- 1.免修模
- 2.免網格



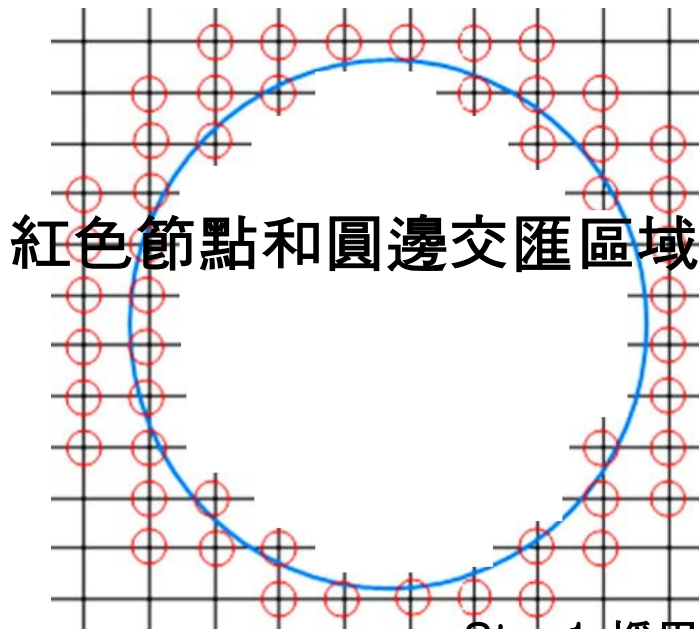
MeshFree
免網格分析軟體



MeshFree- IBM (隱式邊界法)

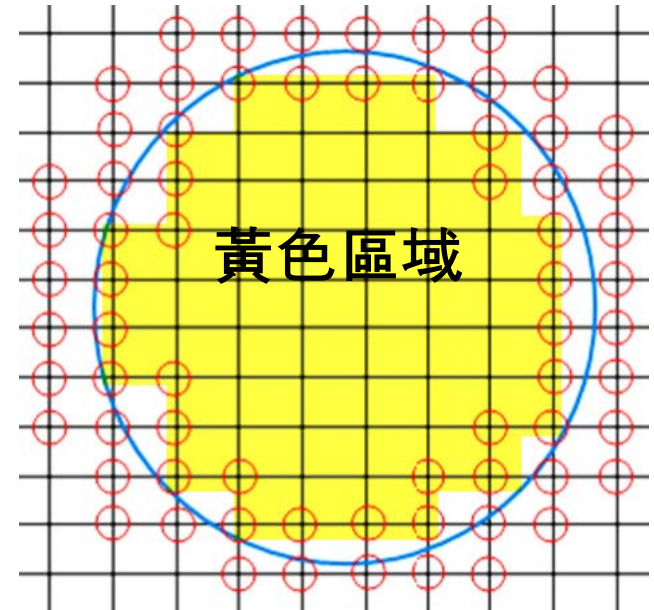
〈邊界區域採用**邊界法**〉

BEM



〈內部採用**擴展有限元法**〉

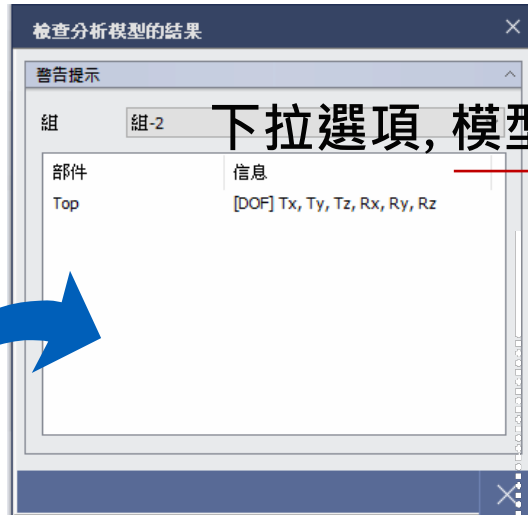
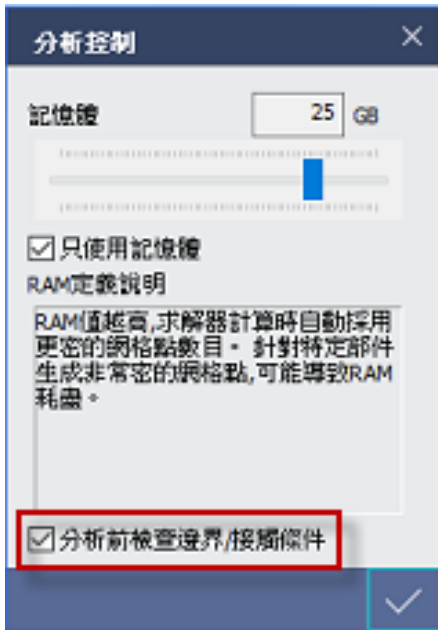
X-FEM



Step1. 採用近似階梯函數計算出邊界數據

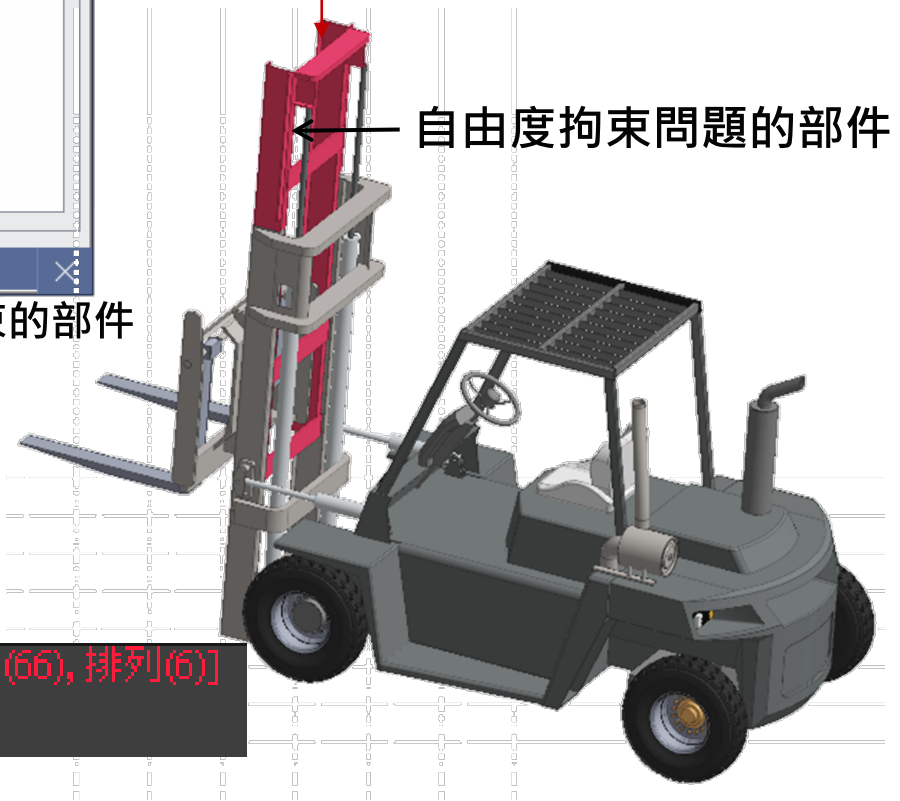
Step2. 邊界數據代入X-FEM矩陣計算

分析前檢查接觸和邊界條件



下拉選項, 模型有問題的部件點選顯示

顯示沒有施加自由度拘束的部件
(約束條件及接觸錯誤)



- ※檢查分析模型
- 檢查奇異點錯誤
- 中文化-錯誤提示

> [錯誤] 邊界條件的定義不夠充分。 [整體剛體自由度(66), 排列(6)]

> [錯誤] 邊界條件定義不正確。

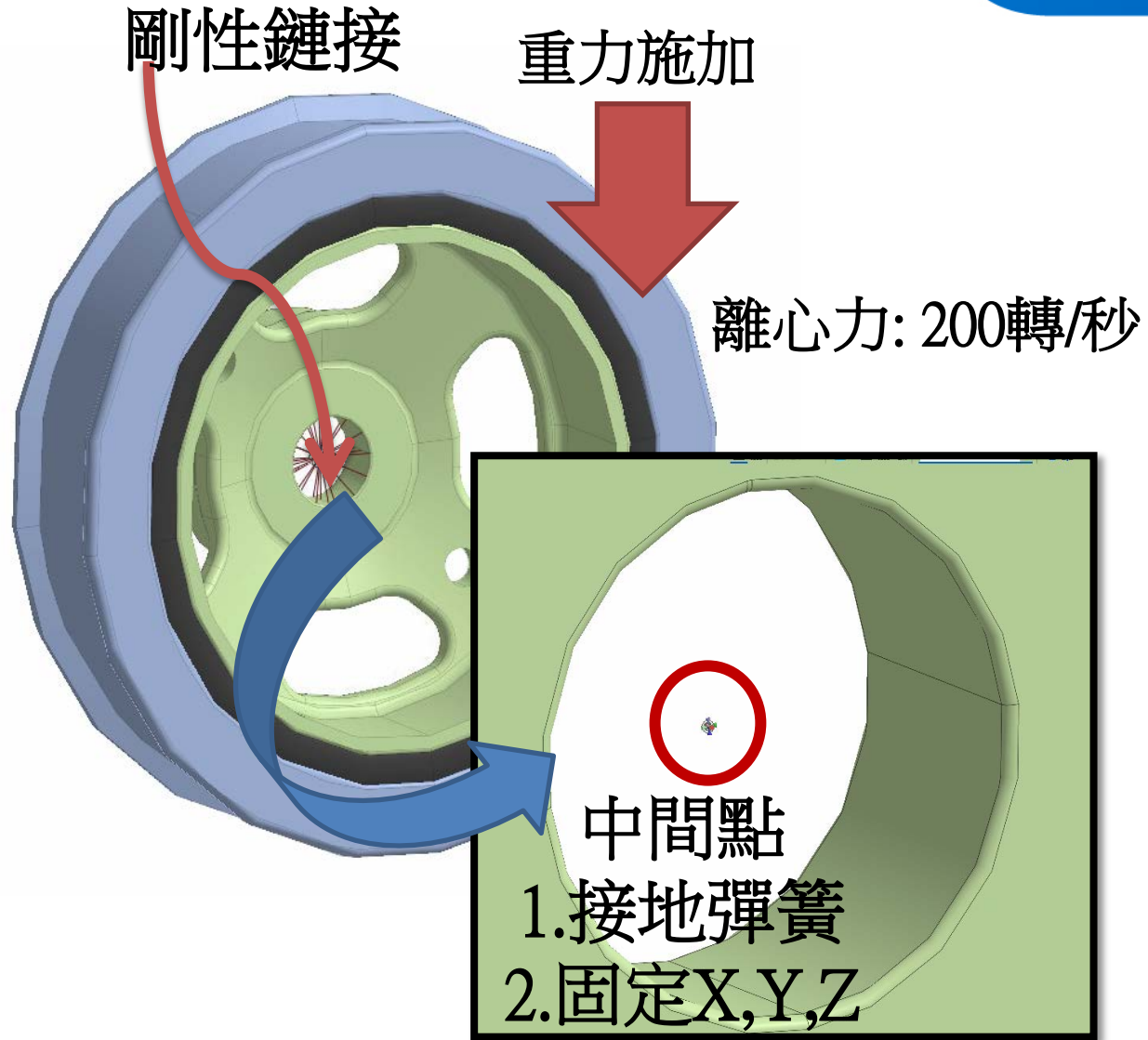


MIDAS
MESHFREE

組合作-輪框



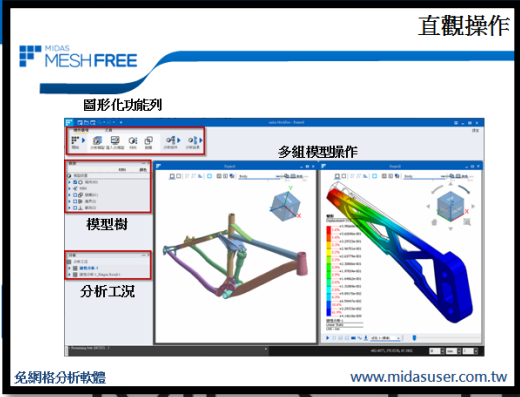
Simple, but Everything.



材料: AL6061

組零件-輪框-操作影片





MeshFree操作影片

[腳踏車線性結構分析](#)

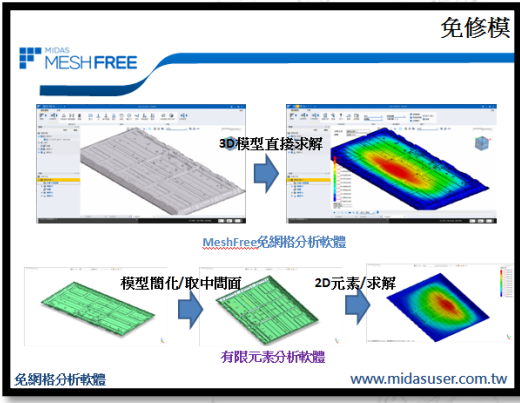
[預力模態分析](#)

[模態分析](#)

[熱傳分析](#)

[熱傳熱應力分析](#)

[拓樸最佳化分析](#)



New Paradigm of CAE,

MeshFree-免網格分析軟體

Simple, but Everything



免費版

標準版

進階版

線性結構分析

模態分析

熱分析

熱應力分析

預力模態分析

拓樸最佳化

疲勞分析

頻率響應

隨機振動

反應譜

瞬態結構分析

瞬態熱分析

非線性分析

註:免費版(無材料庫/限制Ram 0.5G)

New Paradigm of CAE,

MeshFree-免網格分析軟體

MeshFree標準版-試用申請



MeshFree台灣網站

<http://www.midasuser.com.tw/meshfree/index.aspx>



MeshFree專業版-試用申請

1. 試用申請資料必須確實填寫，會有專人連絡。
2. 台灣邁達斯有權決定，是否提供使用者申請試用。

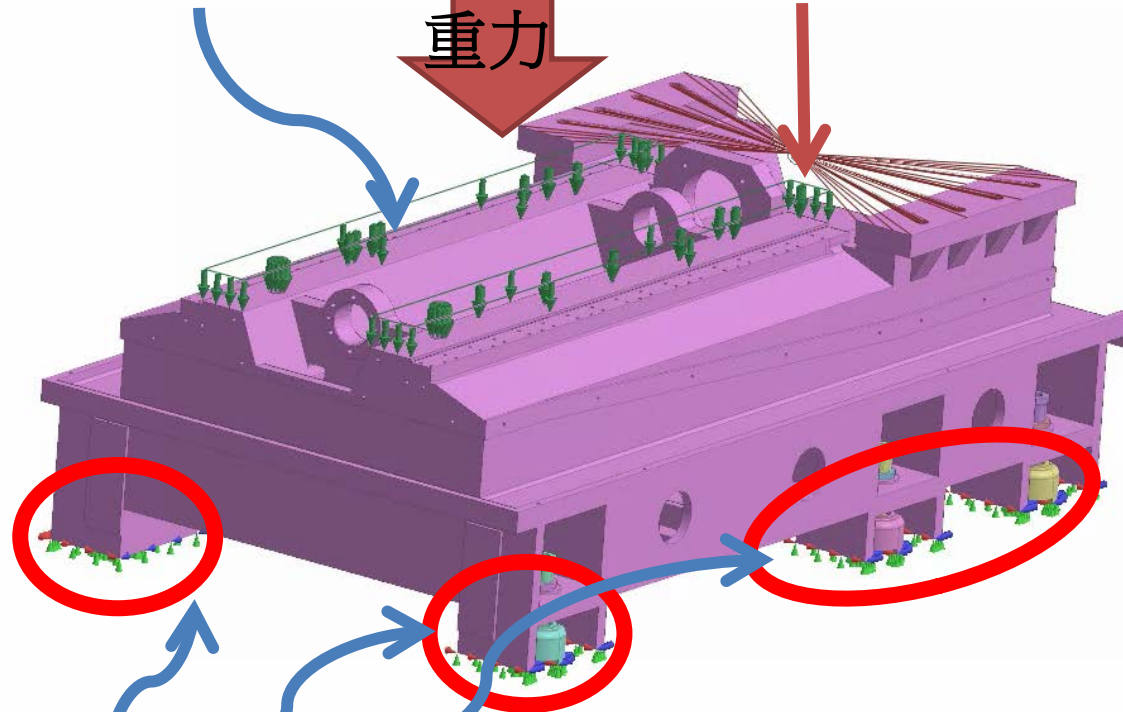
★	真實姓名*	<input type="text"/>
✉	認證信箱*	<input type="text"/>
📞	連絡手機* (ex: 0900123456)	<input type="text"/>
🏢	任職公司/學校*	<input type="text"/>
📍	部門/科系*	<input type="text"/>
📍	地址*	<input type="text"/>
📱	LINE ID*	<input type="text"/>
<input type="button" value="送出申請"/>		

基座組件-多載荷靜剛度分析

滑軌均壓: 20 Nt/mm^2

立柱重假設: 500 Kg

重力



固定X,Y,Z

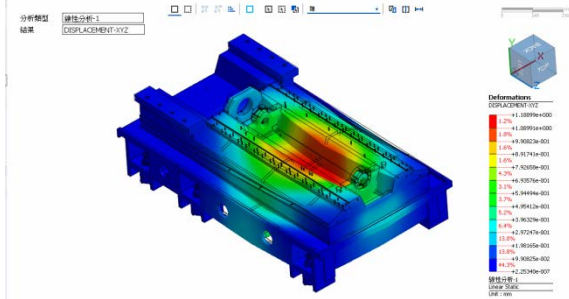
多載荷靜剛度分析-操作影片



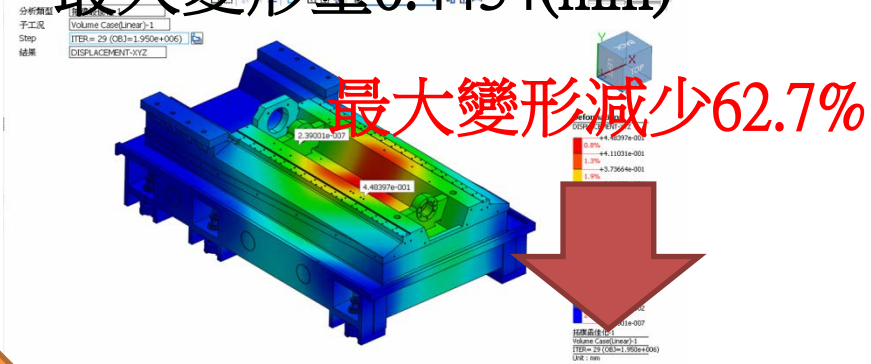
基座組件-靜剛度拓樸改善設計



最大變形量1.189(mm)

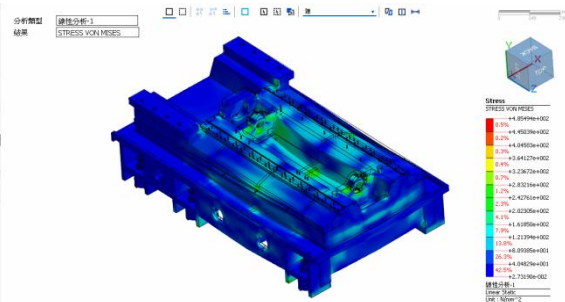


最大變形量0.4434(mm)

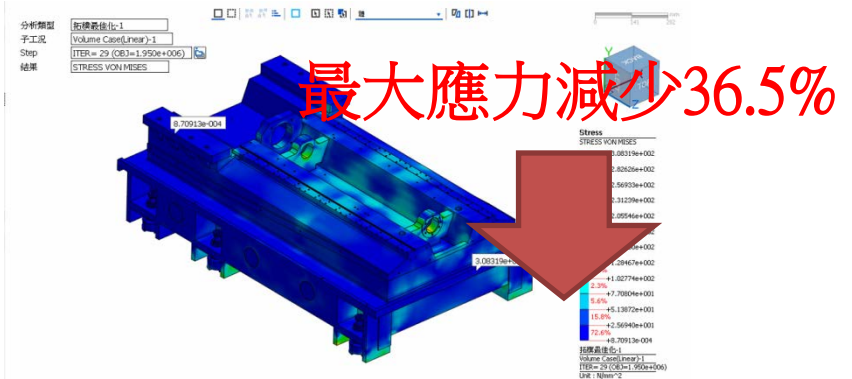


拓樸設計

最大應力485.5(MPa)



最大應力308.3(MPa)



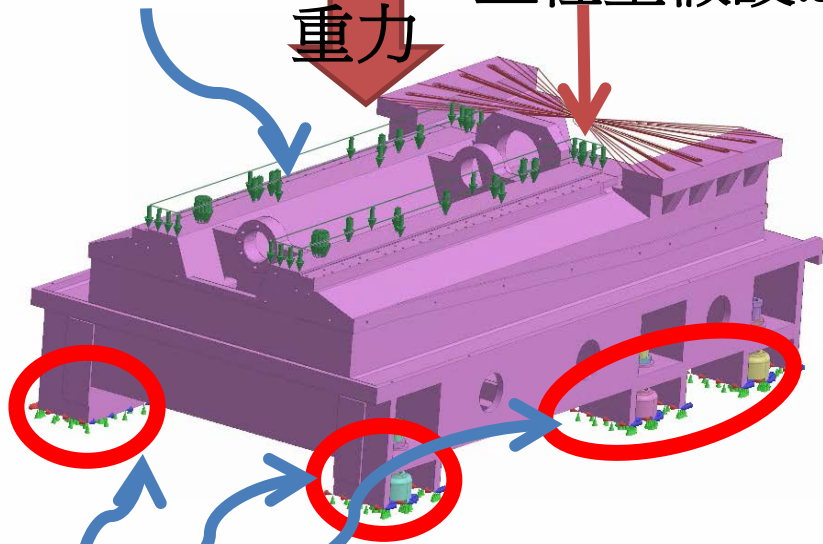
基座組件-靜剛度拓樸改善設計

MIDAS
MESH FREE

滑軌均壓: 20 Nt/mm^2

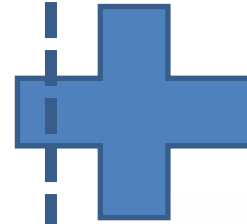
立柱重假設: 500 Kg

重力

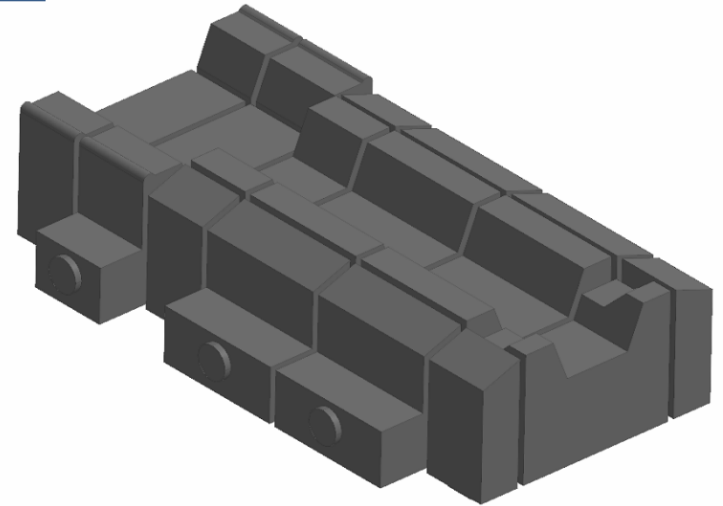


固定X,Y,Z

非設計區域

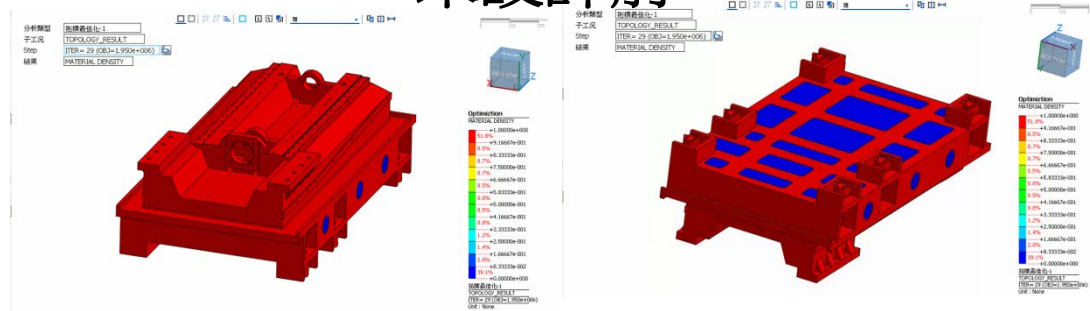


設計區域



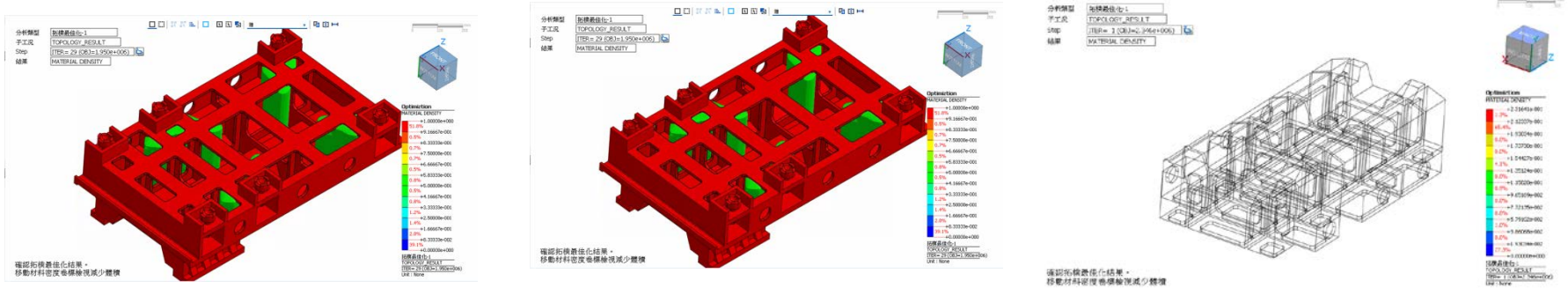
基座組件-靜剛度拓樸改善設計

未設計前



設計區:可變更的範圍

拓樸設計建議

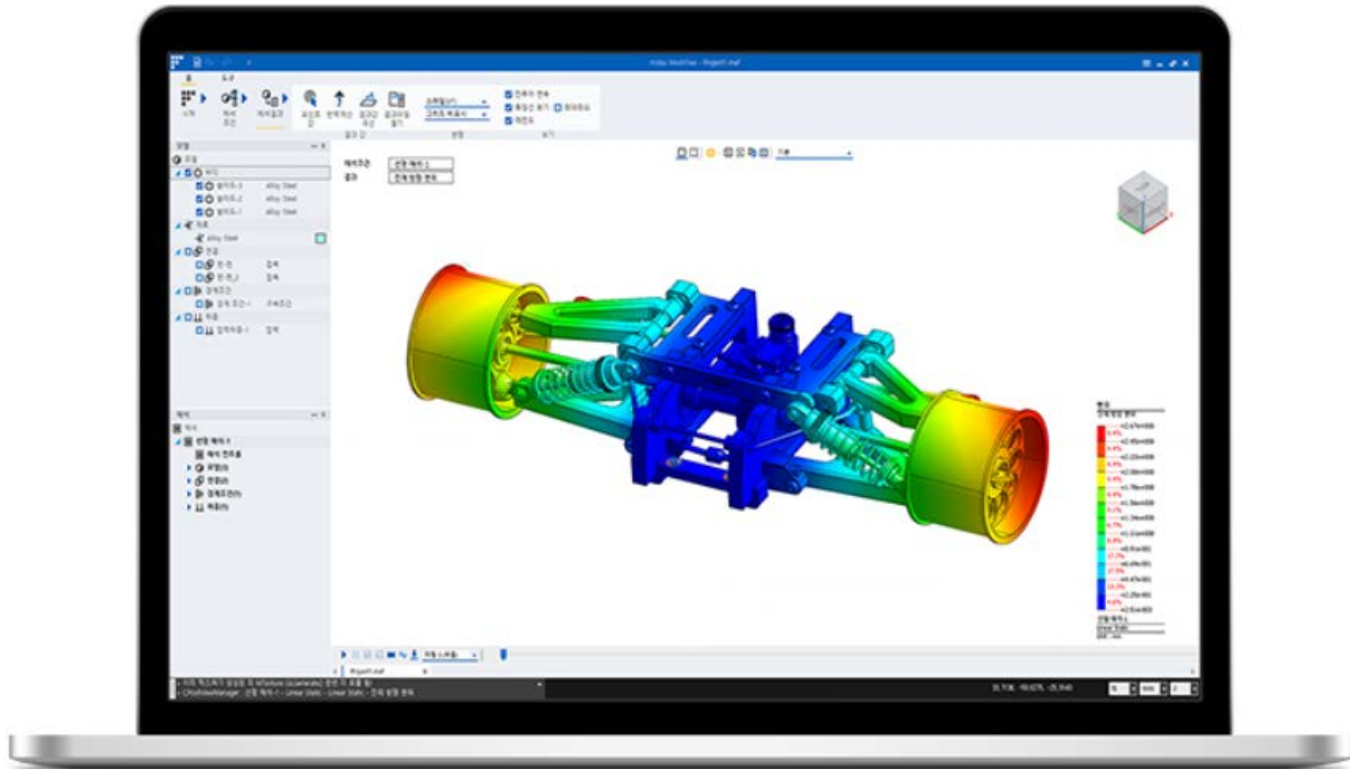


設計區域-材料分佈建議

拓樸改善設計-操作影片



全新的CAE免網格分析軟體, -MeshFree





MeshFree標準版

- 1. 線性結構
- 2. 模態分析
- 3. 熱傳&熱應力分析
- 4. 拓樸最佳化設計
- 5. 線性動態
- 6. 瞬態熱傳&熱應力分析

MeshFree進階版

- 1. 線性結構
- 2. 模態分析
- 3. 熱傳&熱應力分析
- 4. 拓樸最佳化設計
- 5. 線性動態
- 6. 瞬態熱傳&熱應力分析
- 7. 非線性分析
- 8. 複合/橡膠材料分析
- 9. 非線性動態分析
- 10. 多體動力學分析
- 11. 尺寸最佳化
- 12. CFD分析



MIDAS

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Thank you!!

Simple, but Everything.

