



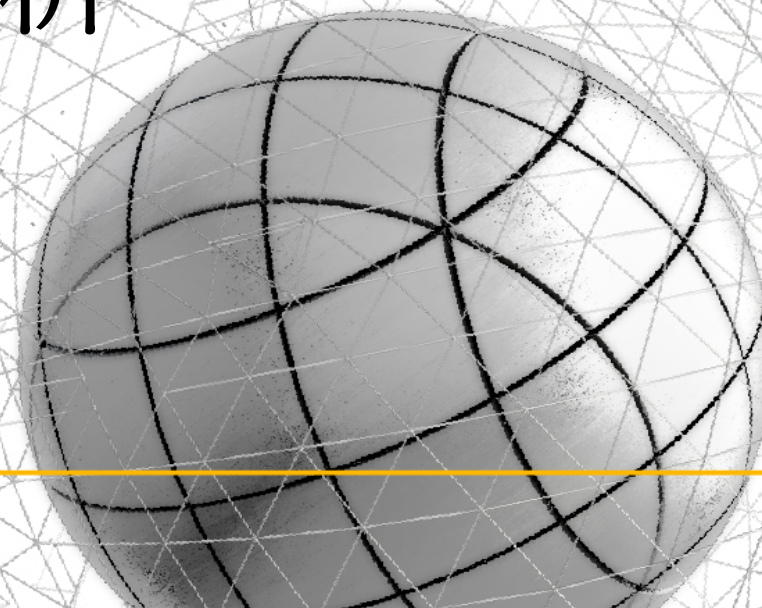
MIDAS

MESH FREE

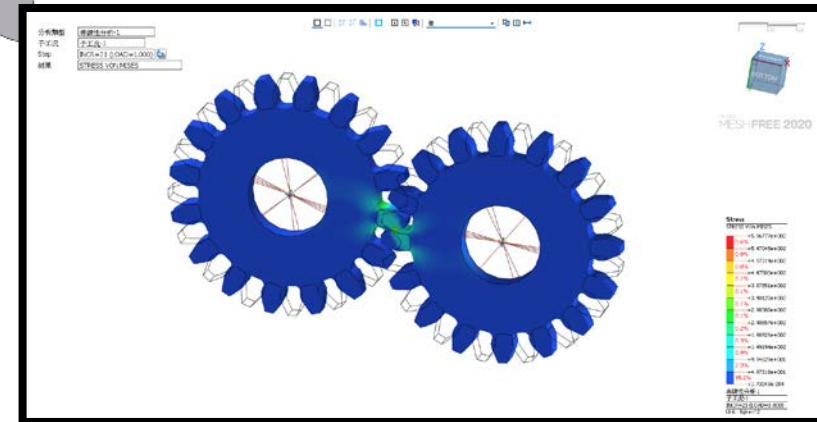
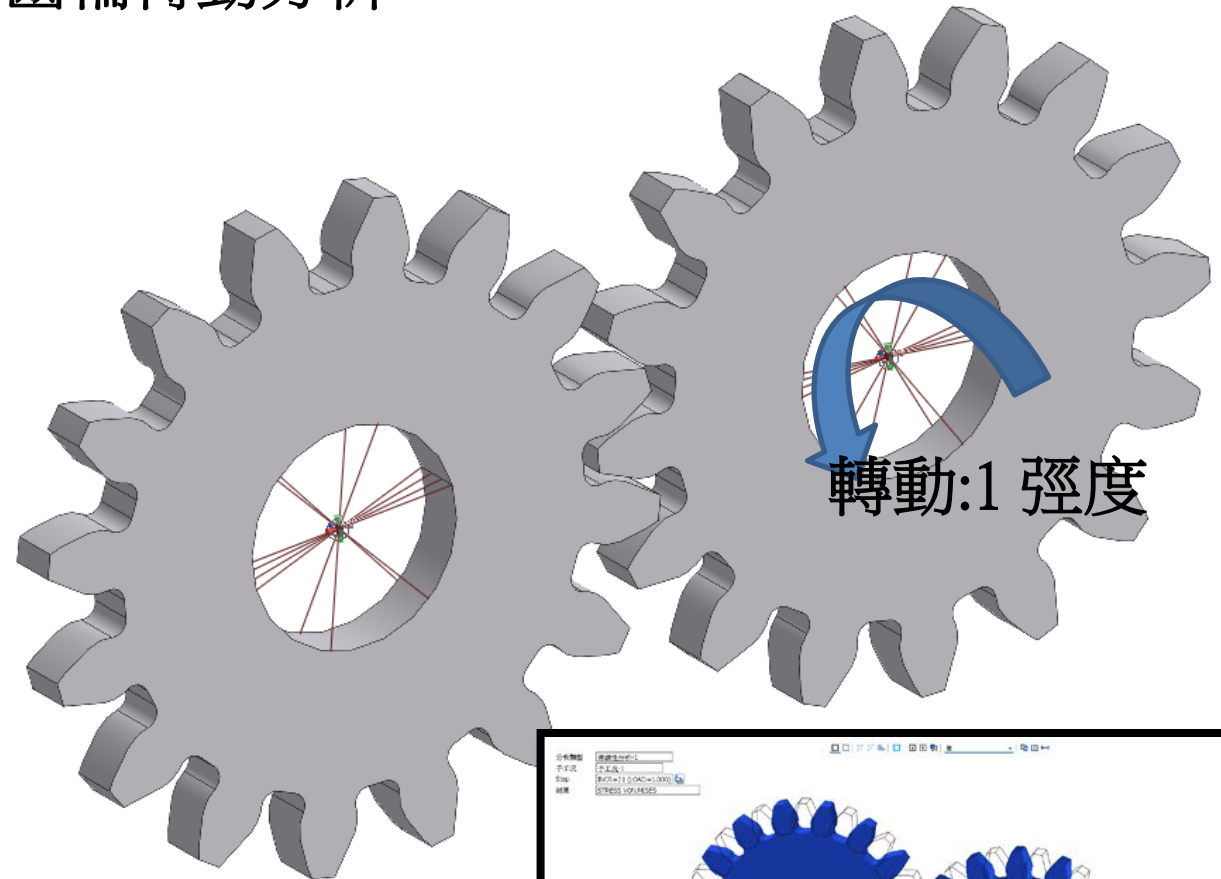
# 接觸非線性 齒輪轉動分析

Simple, but Everything.

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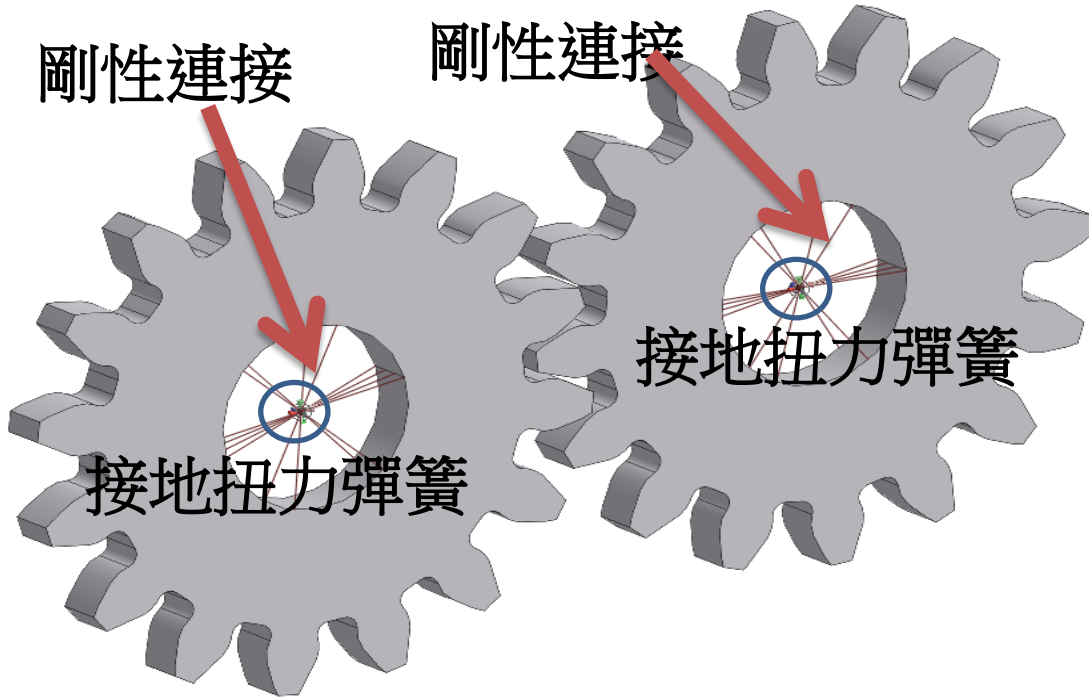


# 齒輪轉動分析

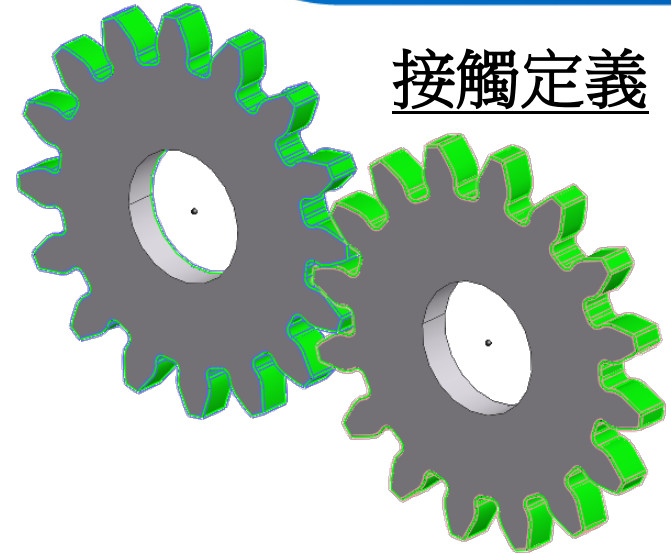


剛性連接

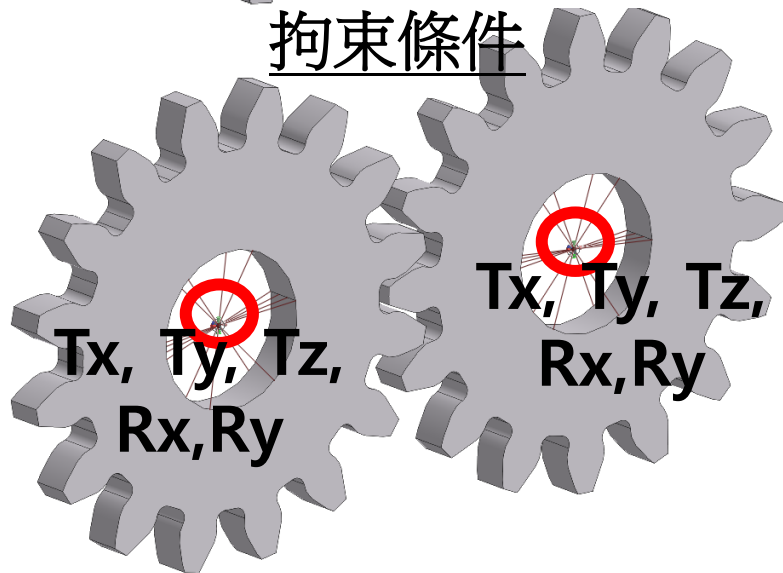
剛性連接



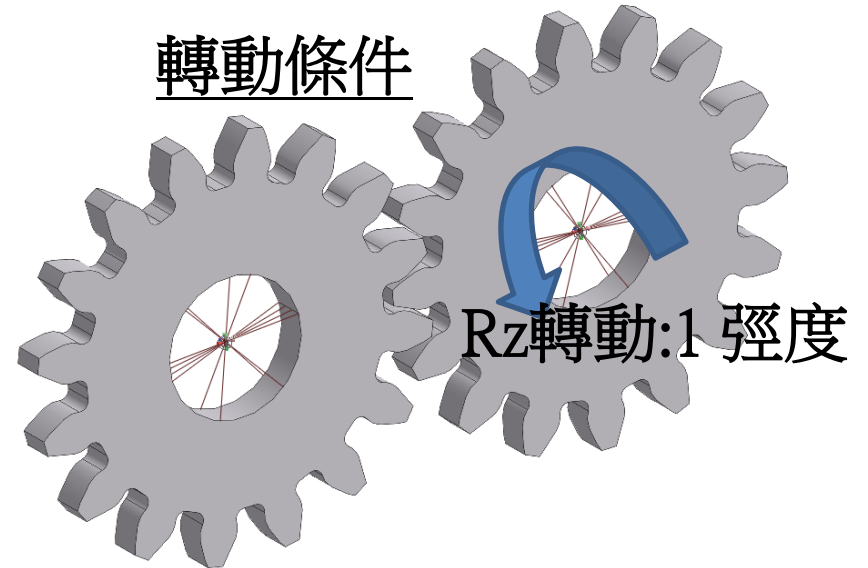
接觸定義



拘束條件



轉動條件

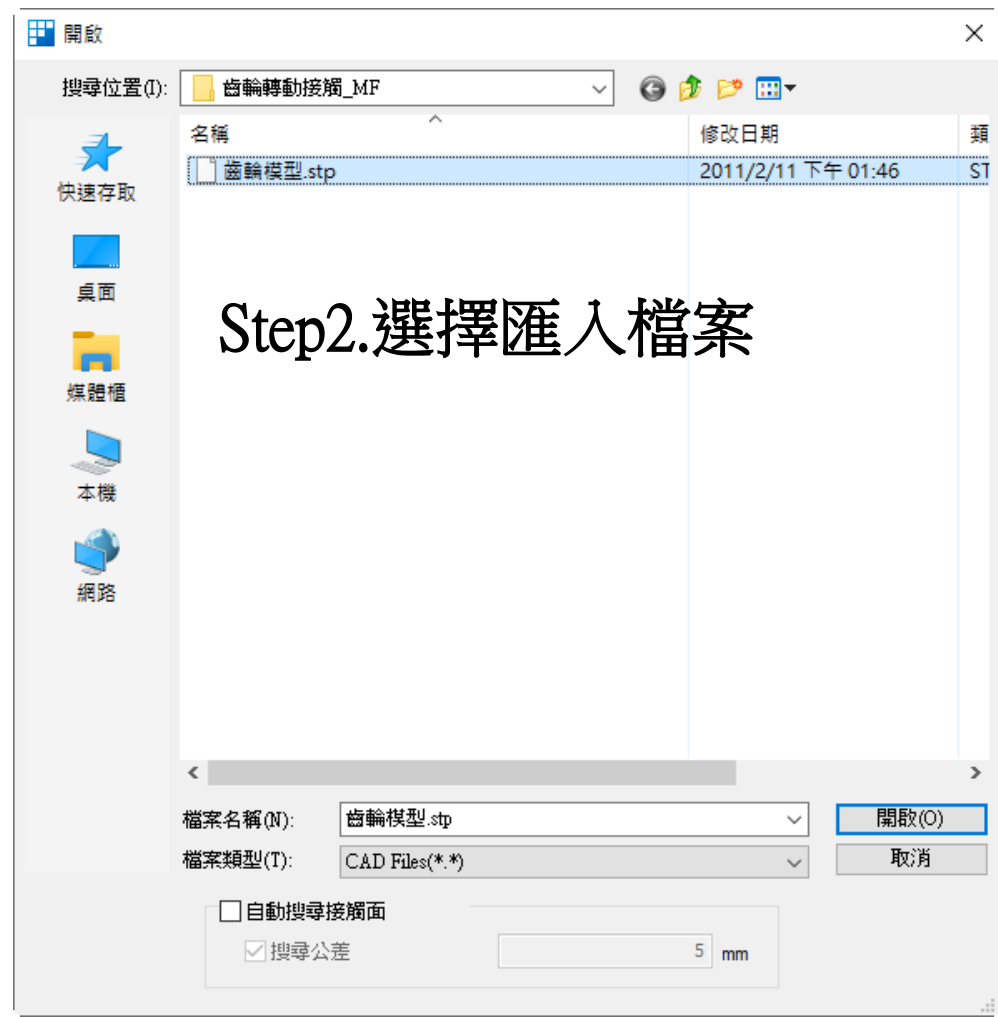




## Step1.匯入3D 模型

## MeshFree支援各類CAD 格式

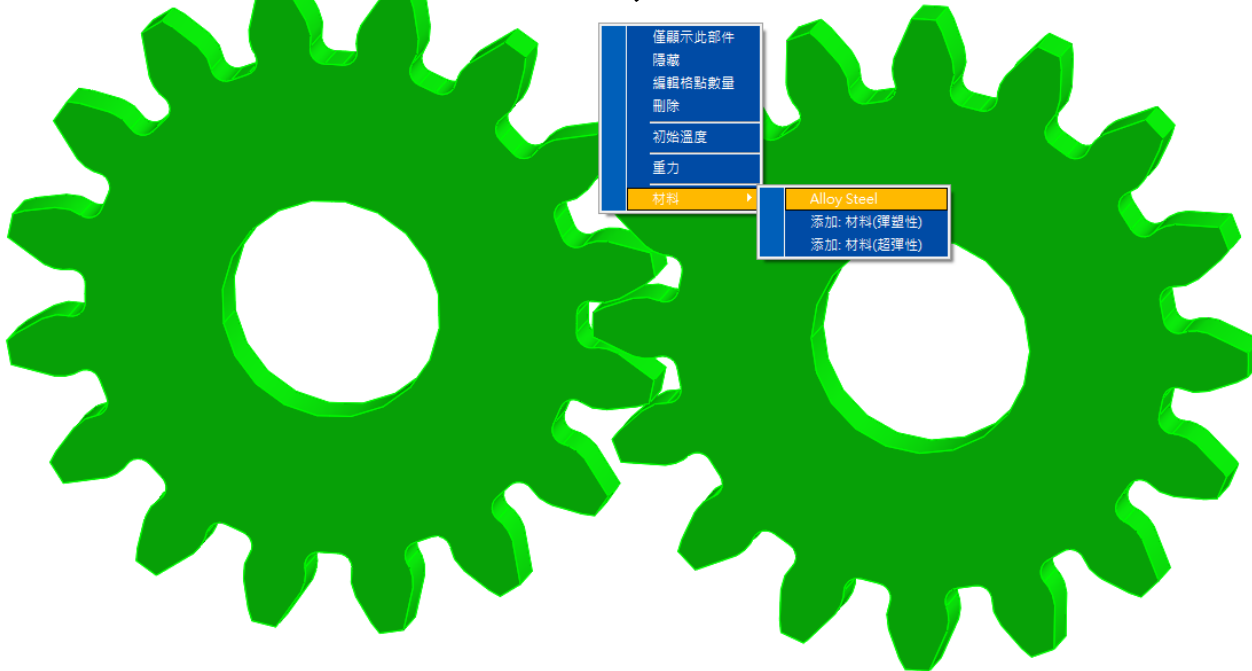
- CAD Files (\*.\*)**
- Parasolid (9 - 31) Files (\*.x\_t;\*.xmt\_txt;\*.x\_b;\*.xmt\_bin)
  - ACIS (R1 - 2020 1.0) Files (\*.sat;\*.sab;\*.asat;\*.asab)
  - STEP (AP203, AP214, AP242) Files (\*.stp;\*.step)
  - IGES (Up to 5.3) Files (\*.igs;\*.iges)
  - Pro-E (16 - Creo 6.0) Files (\*.prt;\*.prt.\*;\*.asm;\*.asm.\*)
  - CATIA V4 (CATIA 4.1.9 - 4.2.4) Files (\*.model;\*.exp;\*.session)
  - CATIA V5 (V5R8 - V5-6R2019) Files (\*.CATPart;\*.CATProduct)
  - Solid Works (98 - 2020) Files (\*.sldprt;\*.sldasm)
  - Unigraphics (11 - NX1847) Files (\*.prt)
  - Inventor Part (V6 - V2020) Files (\*.ipt)
  - Inventor Assembly (V11 - V2020) Files (\*.iam)
  - Solid Edge (V18 - ST11) Files (\*.par;\*.asm;\*.psm)



## Step2.選擇匯入檔案

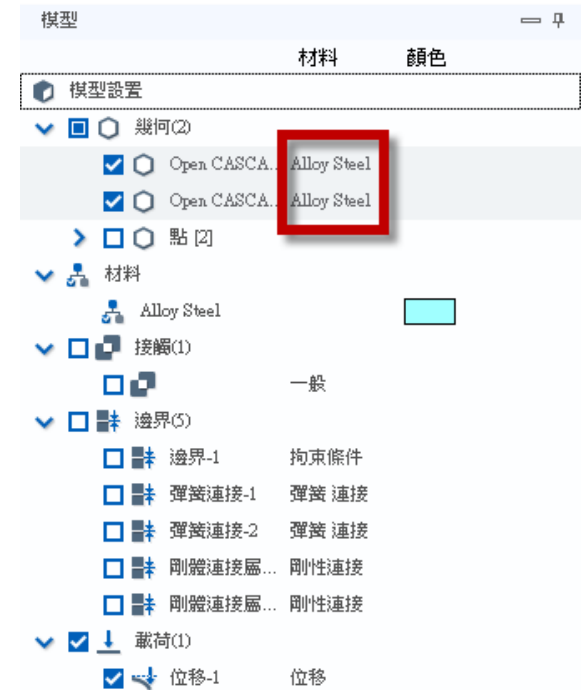
## Step3.關閉自動搜尋接觸面

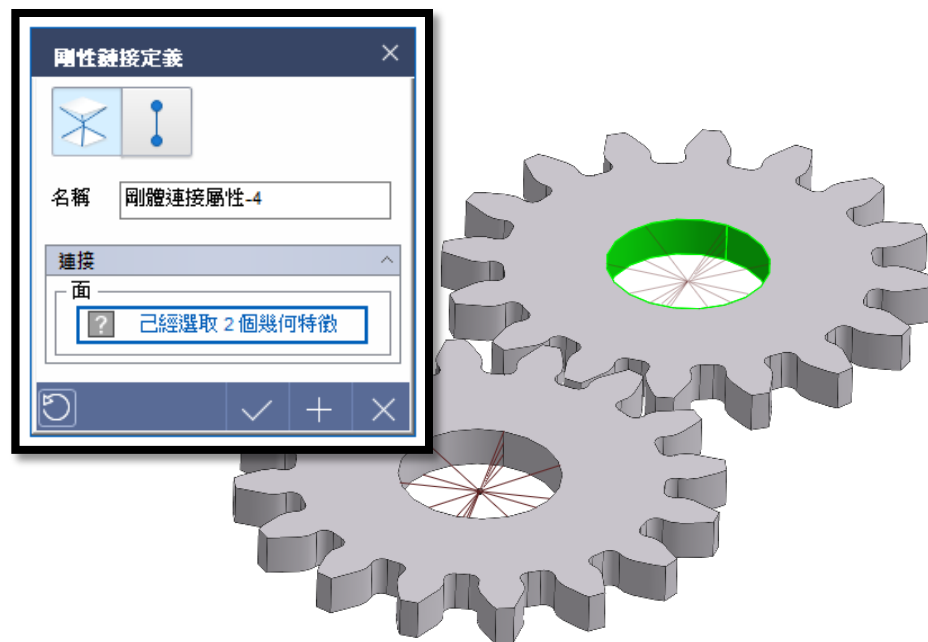
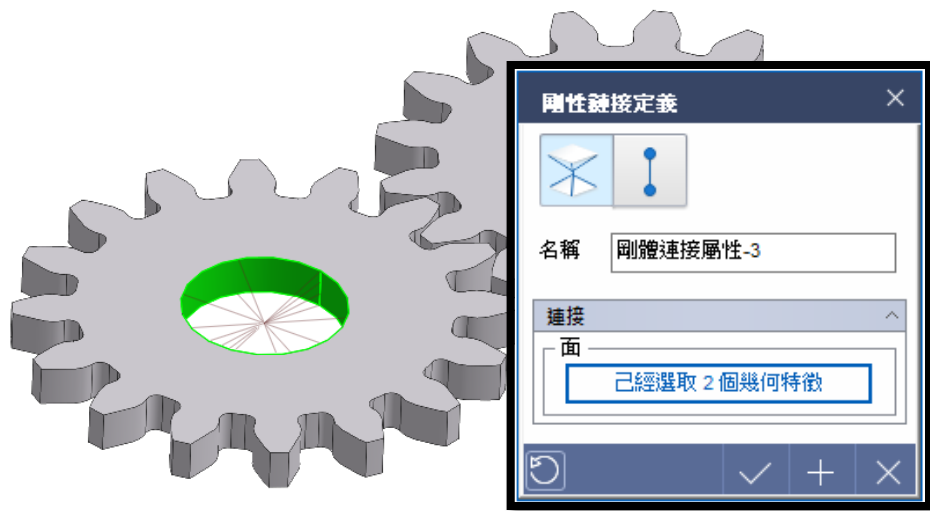
## 滑鼠右鍵,材料指定



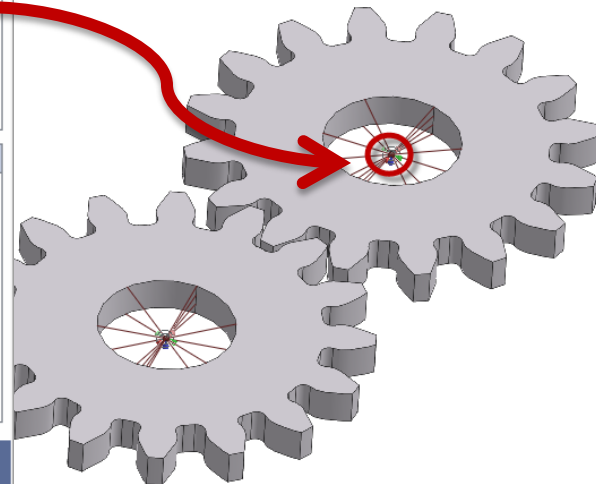
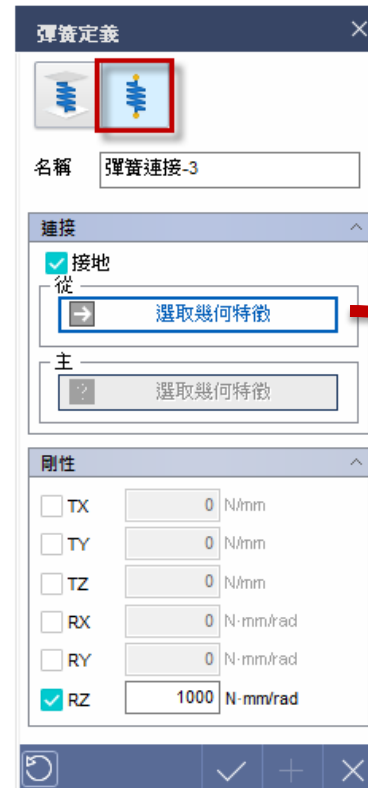
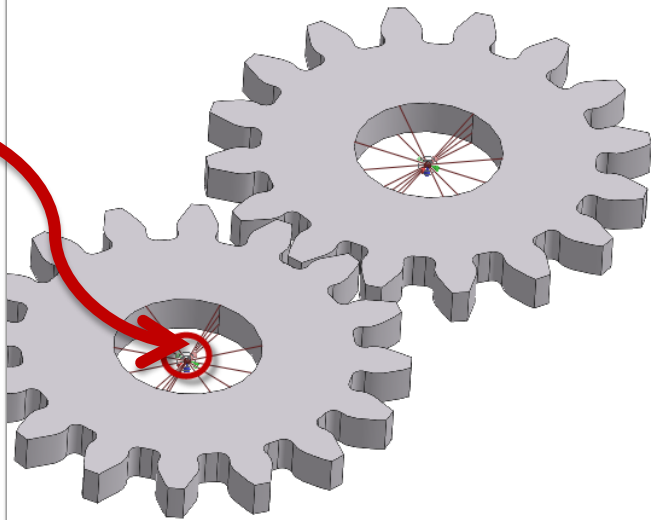
指定使用預設材質 Alloy Steel

## 模型樹顯示指定材料

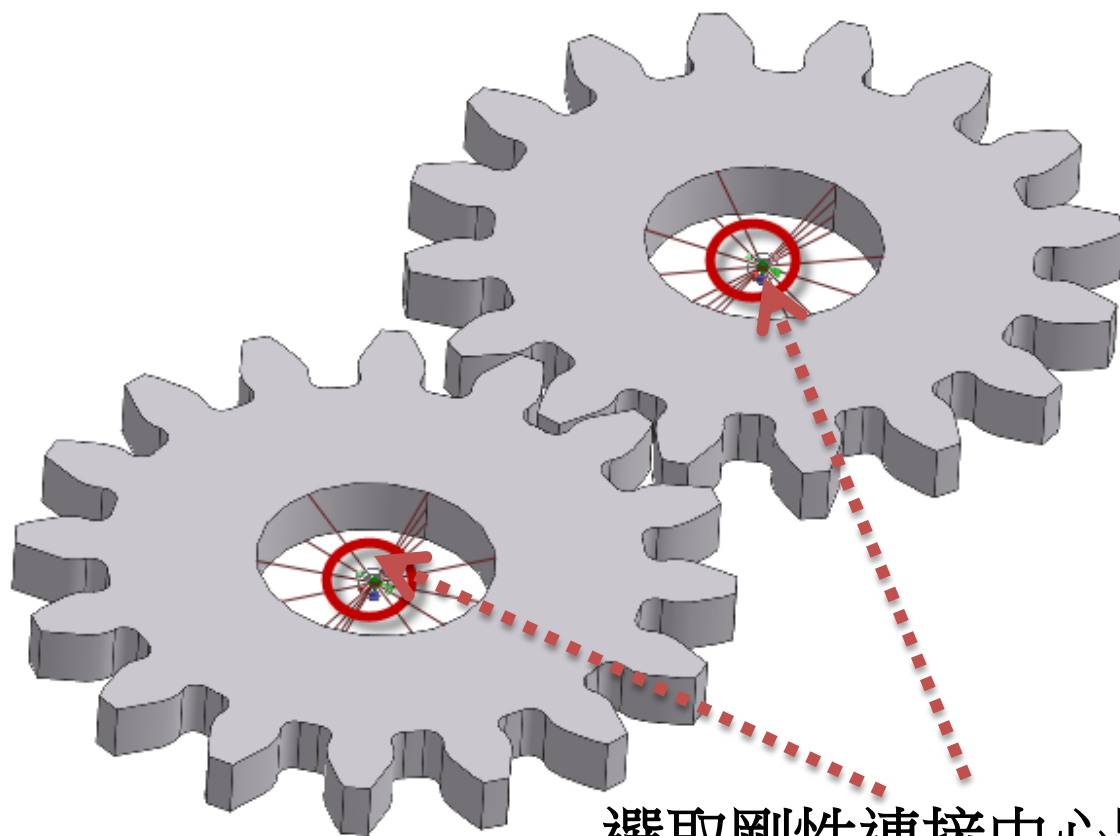




2個齒輪分別定義剛性連接



2個齒輪剛性連接中心,分別定義接地彈簧,定義Rz剛性1000N-mm/rad



選取剛性連接中心點  
拘束Tx, Ty, Tz, rx, ry





施加轉動條件(Rz=1弧度)

位移

名稱 位移-1

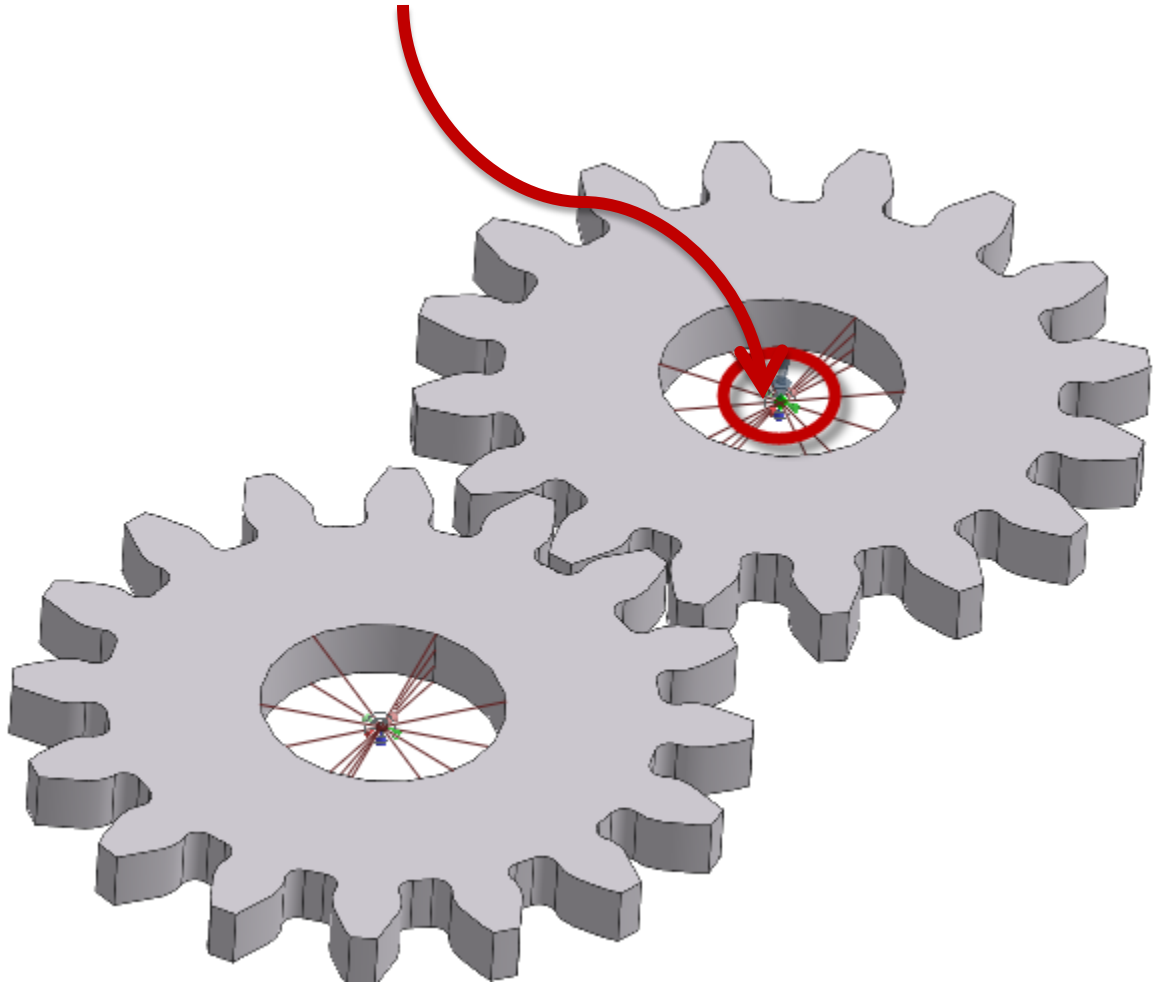
已經選取 1 個幾何特徵

方向

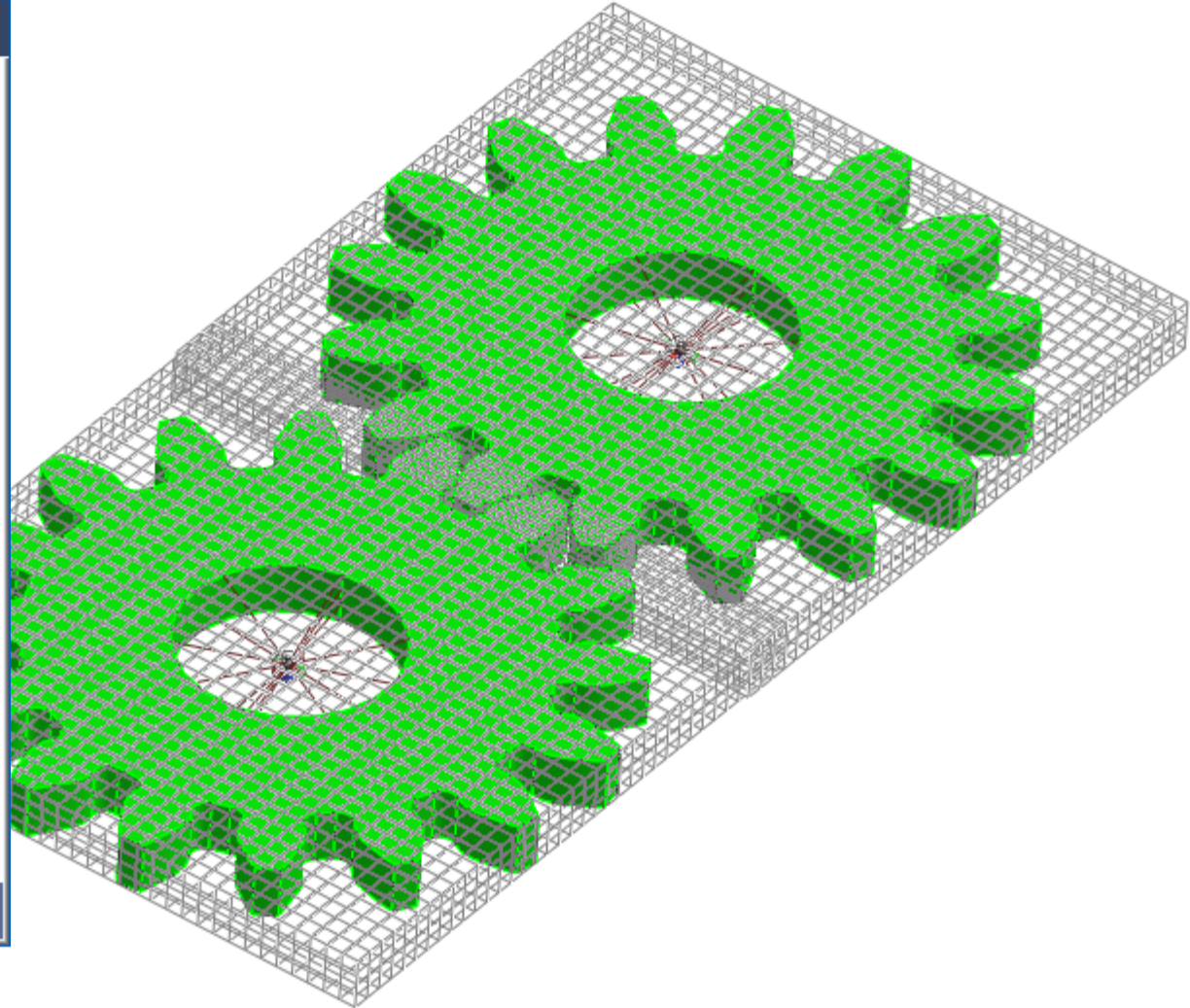
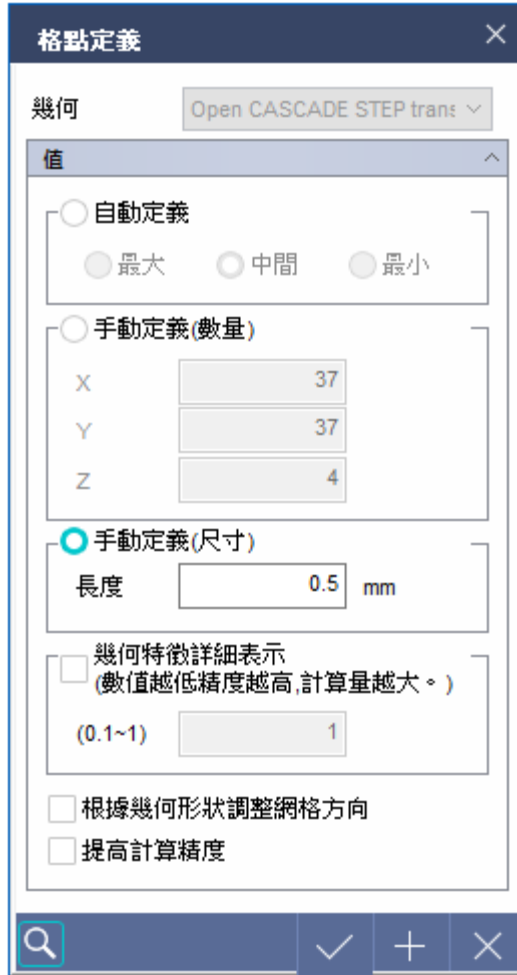
Tx 0 mm  Rx 0

Ty 0 mm  Ry 0

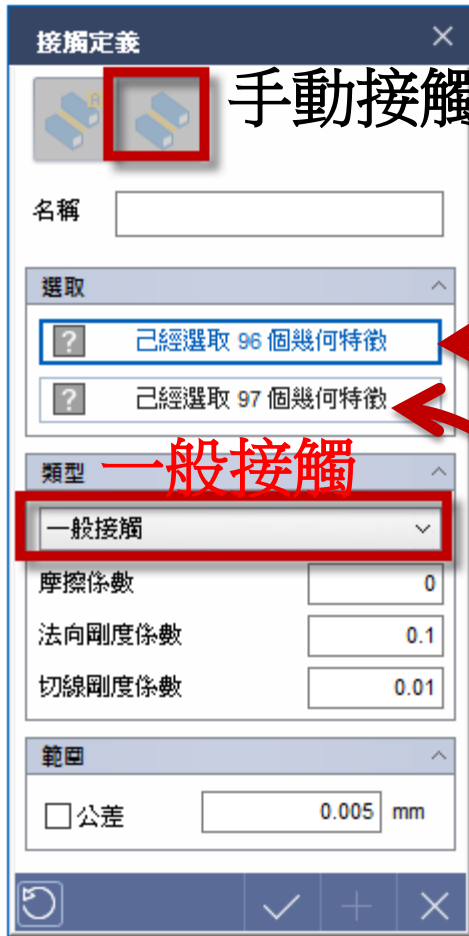
Tz 0 mm  Rz 1



註:1弧度 =  $180 / \pi$

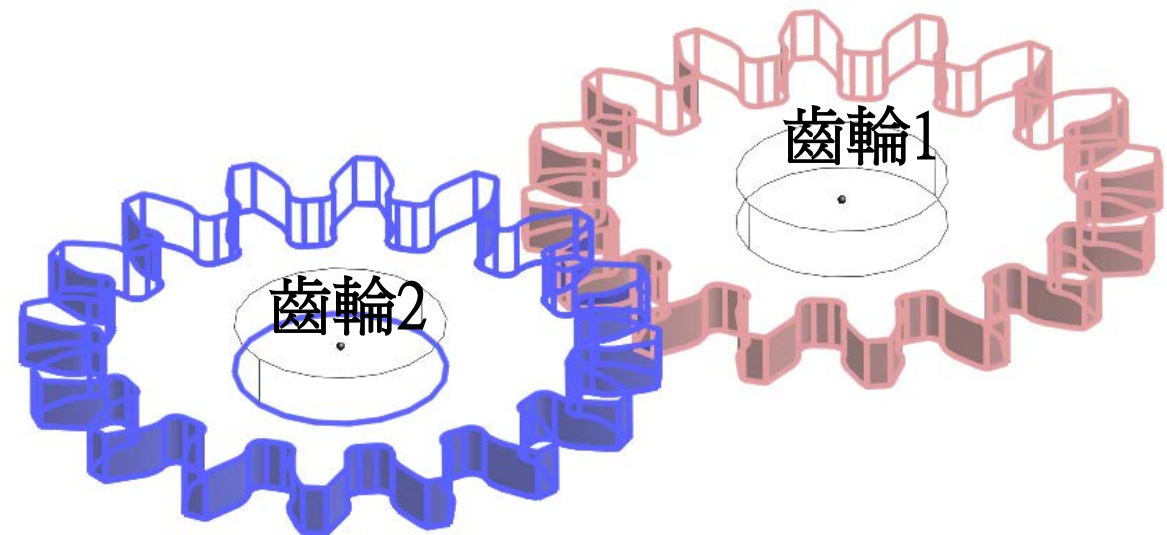


格點尺寸0.5mm



手動接觸定義

Master(齒輪1)



Slave(齒輪2)

註:接觸範圍指的是允許穿透間距

# 分析工況控制



開啓幾何非線性  
(未開啓無法計算接觸)



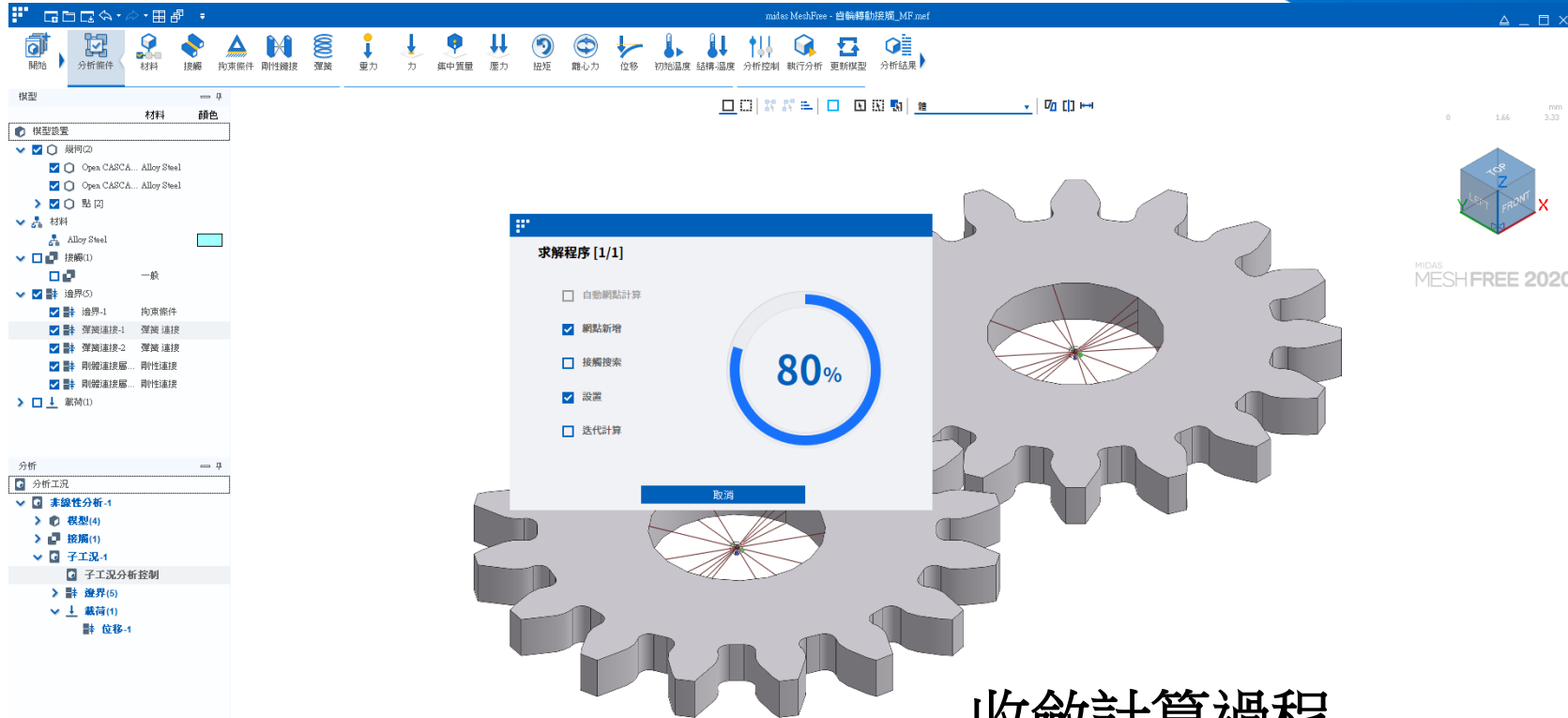
註:無網格法接觸不容易收斂,增加增量數穩定收斂



取消分析前邊界條件檢查



記憶體大小  
1.計算速度  
2.分析準確性



## 收斂計算過程

```

> - RESULT SUMMARY
> MAXIMUM TRANSLATION : 4.5882E+00(T2:35323), MAXIMUM ROTATION : 5.0000E-01(R:3:36)
> INCREMENT=12 (55.00%), ITERATION= 5, ERROR NORMS: P( 3.18E-04/ 1.0E-03) W( 2.83E-07/ 1.0E-06) CONVERGED
> - RESULT SUMMARY
> MAXIMUM TRANSLATION : 5.0601E+00(T2:35323), MAXIMUM ROTATION : 5.5000E-01(R:3:36)
> INCREMENT=13 (60.00%), ITERATION= 5, ERROR NORMS: P( 1.24E-04/ 1.0E-03) W( 4.56E-08/ 1.0E-06) CONVERGED
> - RESULT SUMMARY
> MAXIMUM TRANSLATION : 5.5298E+00(T2:12823), MAXIMUM ROTATION : 6.0000E-01(R:3:36)
> INCREMENT=14 (65.00%), ITERATION= 5, ERROR NORMS: P( 2.23E-04/ 1.0E-03) W( 1.62E-07/ 1.0E-06) CONVERGED
> - RESULT SUMMARY
> MAXIMUM TRANSLATION : 5.9960E+00(T2:12823), MAXIMUM ROTATION : 6.5000E-01(R:3:36)
    
```

# 選擇實際變形顯示

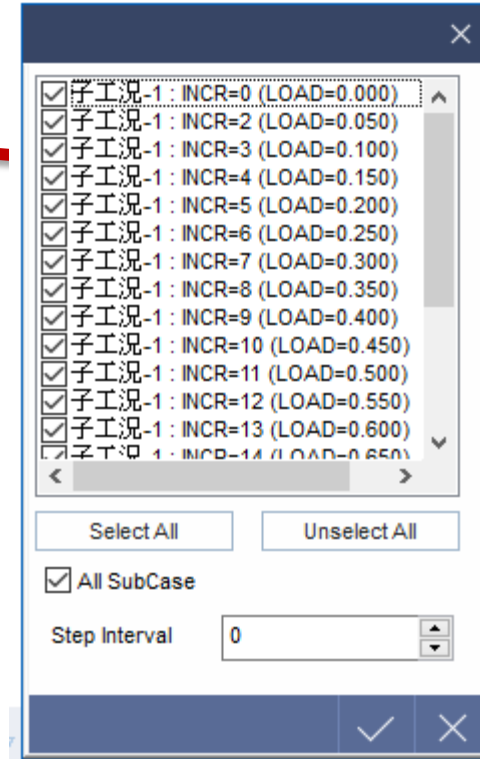
分析結果   
  查詢   
  反力   
  曲線圖   
  結果檔   
  點-結果比較   
  比較結果   
  實際   
  科學記號   
  連續輪廓   
  刻度顯示   
  無網點   
  小數點位數 5   
  平滑雲圖   
  最大 / 最小   
  特徵線視圖   
  動畫

分析類型: 非線性分析-1  
 子工況: 子工況-1  
 Step: INCR=21 (LOAD=1.000) **分析步選取**  
 結果: INCR=0 (LOAD=0.000)  
 INCR=2 (LOAD=0.050)  
 INCR=3 (LOAD=0.100)  
 INCR=4 (LOAD=0.150)  
 INCR=5 (LOAD=0.200)  
 INCR=6 (LOAD=0.250)  
 INCR=7 (LOAD=0.300)  
 INCR=8 (LOAD=0.350)  
 INCR=9 (LOAD=0.400)  
 INCR=10 (LOAD=0.450)  
 INCR=11 (LOAD=0.500)  
 INCR=12 (LOAD=0.550)  
 INCR=13 (LOAD=0.600)  
 INCR=14 (LOAD=0.650)  
 INCR=15 (LOAD=0.700)  
 INCR=16 (LOAD=0.750)  
 INCR=17 (LOAD=0.800)  
 INCR=18 (LOAD=0.850)  
 INCR=19 (LOAD=0.900)  
 INCR=20 (LOAD=0.950)  
 INCR=21 (LOAD=1.000)

非線性分析-1  
 子工況-1  
 INCR=21 (LOAD=1.000)  
**DISPLACEMENT-XYZ** **分析結果類型選取**  
 DISPLACEMENT-XYZ  
 STRAIN VON MISES  
 STRESS VON MISES  
 DISPLACEMENT-X  
 DISPLACEMENT-Y  
 DISPLACEMENT-Z  
 STRESS PRINCIPAL A  
 STRESS PRINCIPAL B  
 STRESS PRINCIPAL C  
 EFFECTIVE PLASTIC STRAIN  
 EQUIVALENT STRESS  
 法向接觸力  
 切向接觸力  
 接觸壓力  
 接觸剪切應力



選取連續步結果播放



切換單一分析或連續分析步播放

動畫播放後  
可以製作連續步影片 (AVI/GIF)

