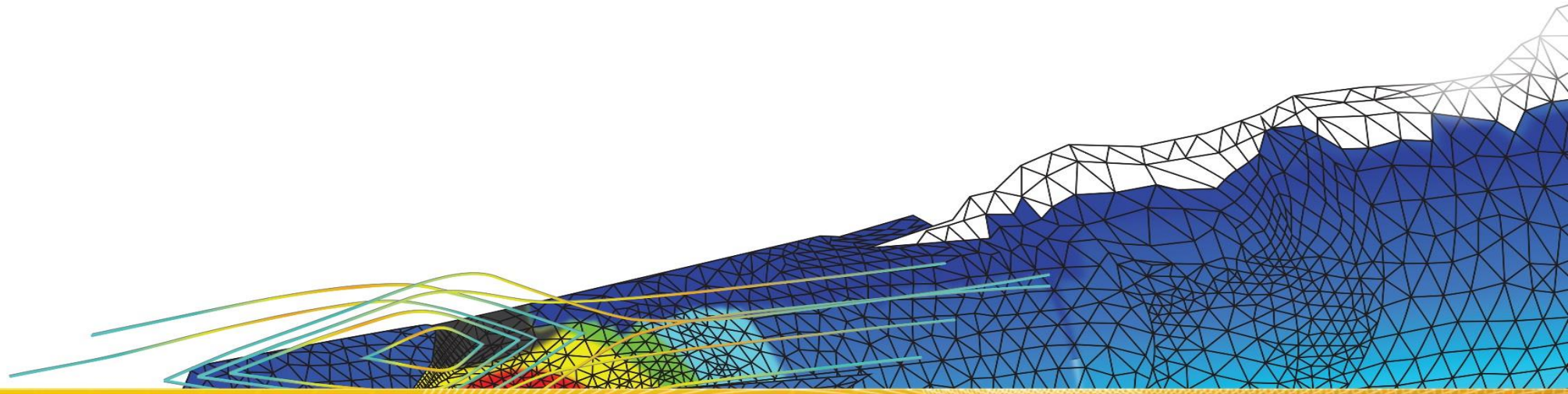
Extracting Stiffness and Mass Matrix in Workbench



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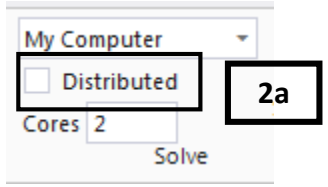
Description

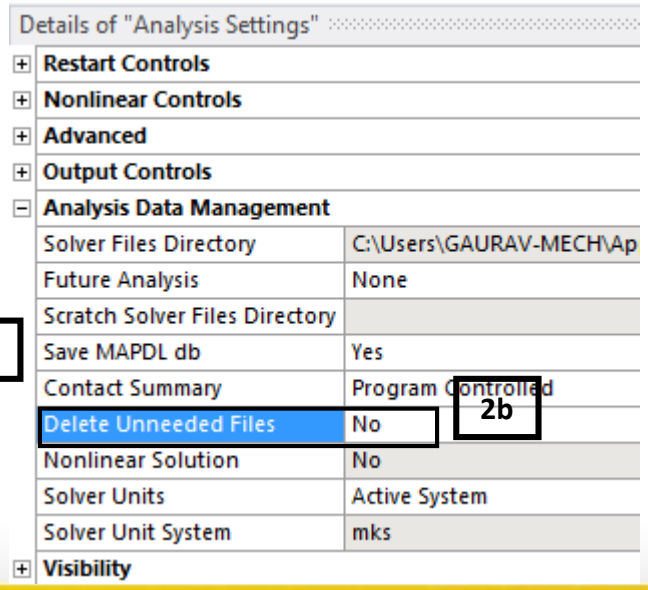
- In design analysis, you may want to extract the full or sparse stiffness and mass matrix generated in a modal analysis or stiffness matrix generated for steady state analysis in order to verify or utilize it for comparison purposes. In this tutorial we explore the way on how we can extract this from Workbench.

Solution

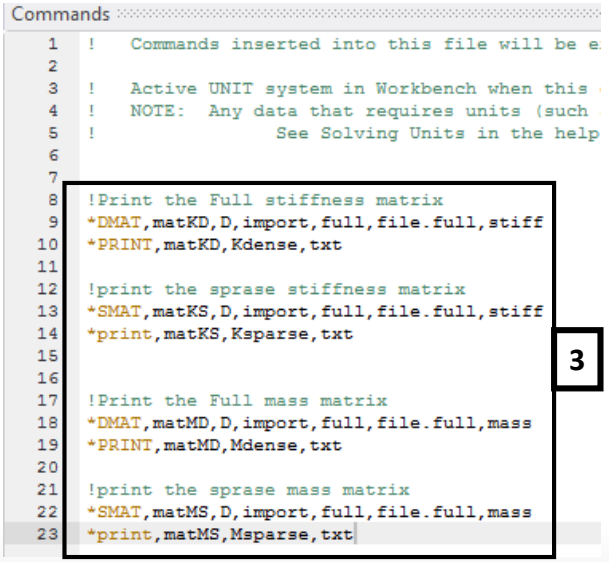
1. Given, you have finished setting up you model, we start with the process of extracting the information.
2. Few prerequisites for this is as follows,
   a) Distributed solve (DMP) procedure is not supported. So switch to SMP (Shared Memory Parallel) solver. **Untick** the box in front of **Distributed**
   b) In the Analysis Settings, go to details of analysis settings > Analysis Data management and set **Delete Unneeded File** to **NO.** (Default is Yes).
3. Given You have carried out the above steps (2a and 2b), Now Insert a command snippet under the solution.
4. Insert the following commands, mentioned on the next slide



2a



2b



3

Solution

```
!Print the Full stiffness matrix
*DMAT, KmatrixF, D, import, full, file.full, STIFF !fetching the full stiffness matrix from .FULL file
*PRINT,KmatrixF,Kdense.txt                    !converting the file obtained into .txt format

!print the sparse stiffness matrix
*SMAT, KmatrixS, D, import, full, file.full, STIFF !fetching the sparse stiffness matrix from .FULL file
*PRINT,KmatrixS,Ksparse.txt

!Print the Full mass matrix
*DMAT, MmatrixF, D, import, full, file.full, MASS !fetching the full mass matrix from .FULL file
*PRINT,MmatrixF,Mdense.txt

!print the sparse mass matrix
*SMAT, MmatrixS, D, import, full, file.full, MASS !fetching the sparse mass matrix from .FULL file
*PRINT,MmatrixS,Msparse.txt
```

Summary

- Using these set of APDL commands you can extract the required stiffness and mass matrix as applicable for the problem under consideration.
- If you want to convert to MMF format, TXT format or any other format you can check the ANSYS help file for the list of formats available to be extracted.