

#1237: OptiStruct - PARAM, MAXRATIO to detect the singularity

Product: OptiStruct

Product Version: OptiStruct 2017.1 or above

Topic Objective

PARAM, MAXRATIO to detect the singularity in OptiStruct

Topic Details

- Singularity caused by modeling error (such as the model without proper boundary condition) could be detected by PARAM,MAXRATIO,X.
- MAXRATIO higher than the value X specified by PARAM,MAXRATIO, will be flagged as error and the job will be terminated.

$$\text{MAXRATIO} = \frac{A_{ii}}{D_{ii}}$$

A_{ii} = Diagonal term of Original Stiffness matrix

D_{ii} = Diagonal term of Factor matrix D in $A=LDL^T$

- Error message when MAXRATIO is higher than the value the user specifies.

```
*** ERROR # 3451 ***
The following DOFs violate the defined MAXRATIO 10000.
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      Grid No.      Component      Ratio
-----
      560           1           2.782e+012
      560           2           1.129e+009
      560           3           1.13e+011
```

- Grid id and DOF reported could be any grid/dofs in problematic part of the model i.e. free-flying part of component for insufficient or no SPC model.
- Supported for linear static analysis only. No Optimization support.

Supported with BCS solver only.