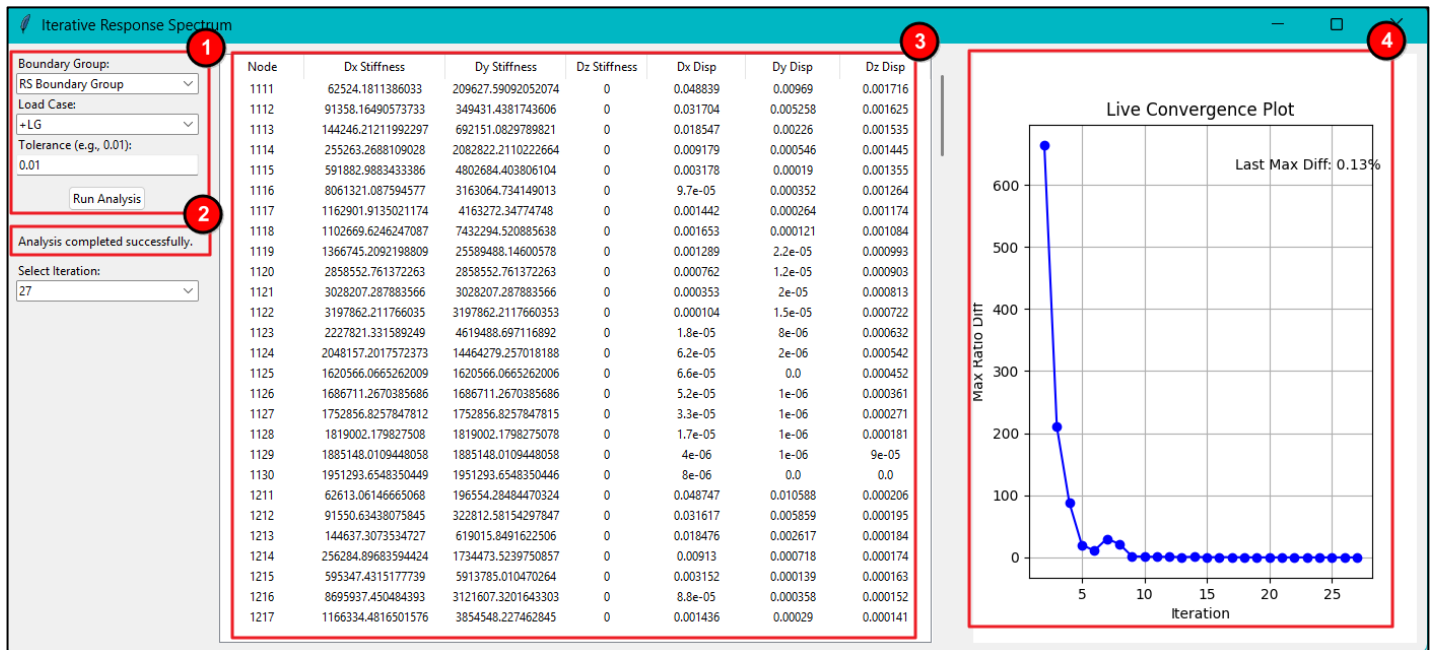


Iterative Response Spectrum notes – 22-04-2025

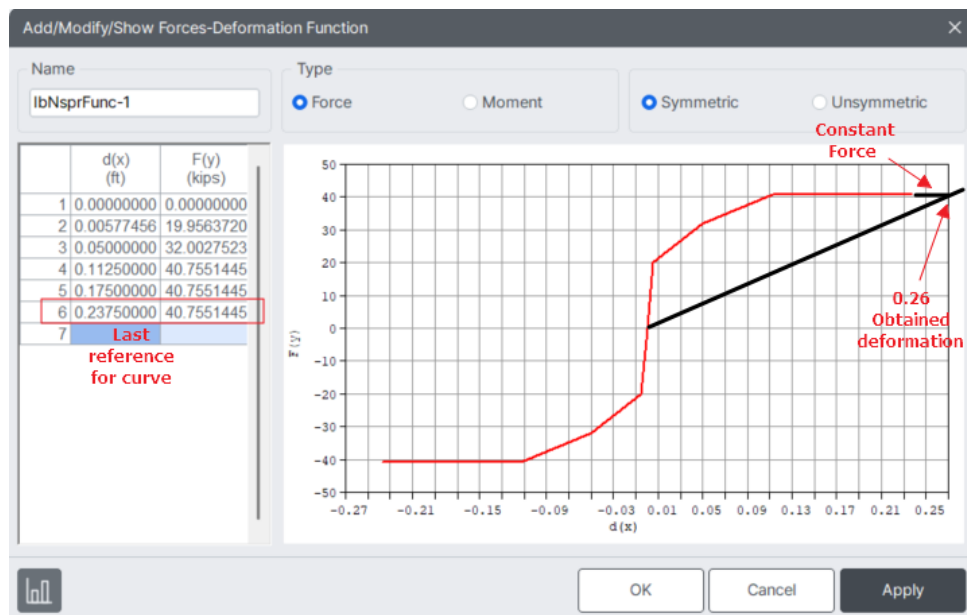
ITRS Python Script UI- v2.0



This PC > DATA IMP (D:) > temp > testing itr > local axes > local final >				
Sort View ...				
Name	Date modified	Type	Size	
__pycache__	17/04/2025 10:47 PM	File folder		
debug_log.csv	17/04/2025 10:49 PM	Microsoft Excel Comma Separated ...	1 KB	
iterative_local_1.py	17/04/2025 10:45 PM	Python Source File	23 KB	
iterative_local_gui_1.py	17/04/2025 10:17 PM	Python Source File	7 KB	

Assumptions considered for Iterative Response Spectrum script

- 1. Force-deformation Function-** is considered symmetric in +ve and -ve direction.
Eg. Spring defined in +Dx/-Dx direction will be converted to +Dx.
F-D function should also not contain any negative slope.
- 2. Linear Spring Stiffness-** If a node has a multi-linear spring definition only in one direction then after the first iteration, a minimal stiffness (0.001 only for translational dof) will be applied to other directions.
- 3. Uniform capacity-** If a deformation exceeds beyond the definitions provided in the Force-deformation function, the ITR script will consider constant force from the last available location until the new obtained deformation.
e.g. new deformation is 0.26 ft (refer below)



- 5. Node local axis-** If node local axis are defined at the multi-linear spring definition, the node local displacements will be used for secant stiffness calculation. If not defined, global node displacements will be used.

6. Construction Stages

Without construction stages- If CS are not defined, then all the nodes with multi-linear definitions will be considered for the ITR script iteration.

With construction stages- If CS is defined, then software filters the nodes to be considered in the following manner:

Checks the boundary groups that are active in the last construction stage -> Identifies the point linear/multi-linear springs from those active boundary groups -> These nodes are considered in ITR Script iteration.

Note: Boundary parameters under 'Default' option/group will not be considered for the plugin.

7. Tolerance- Tolerance should be entered in ratio i.e. 0.05 = 5%. It will be checked against all translational dof (local/global). It checks displacement of nodes relative to the previous iteration.

Tolerance check example:

Tolerance: 0.01

Old displacement = 5 ; New displacement = 6

$\text{Tolerance} = (6-5)/5 = 0.2 > 0.01$.

Therefore, interpolate force for 'new displacement', calculate stiffness and run analysis again.

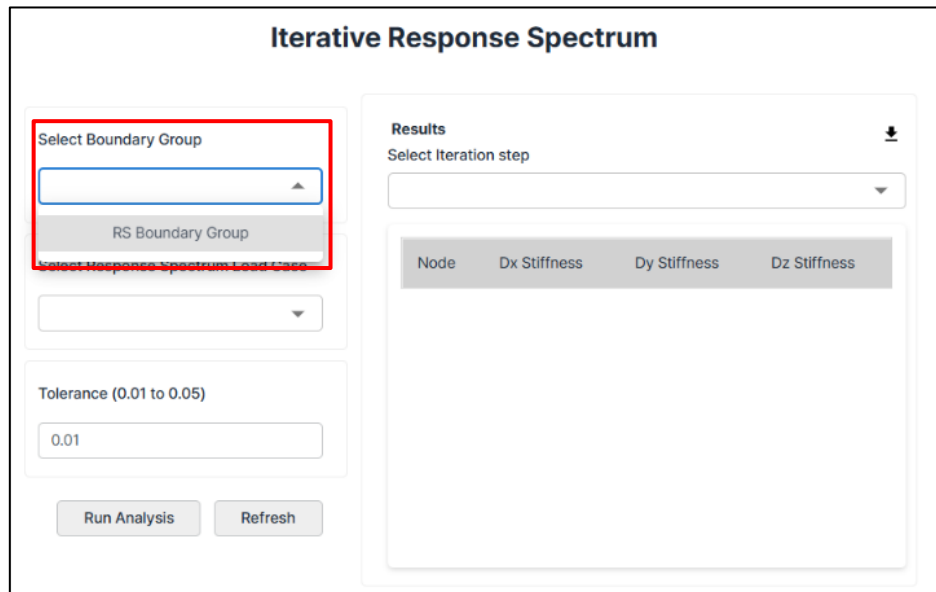
Steps to use Iterative Response Spectrum v1.0:

NX marketplace- Response Spectrum Generator

Step 1: Create an empty Boundary Group

Step 2: Click 'Connect' -> Open Marketplace and Run Iterative Response Spectrum plugin

Step 3: Select an empty Boundary Group



Iterative Response Spectrum

Select Boundary Group

RS Boundary Group

Select Response Spectrum Load Case

Tolerance (0.01 to 0.05)

0.01

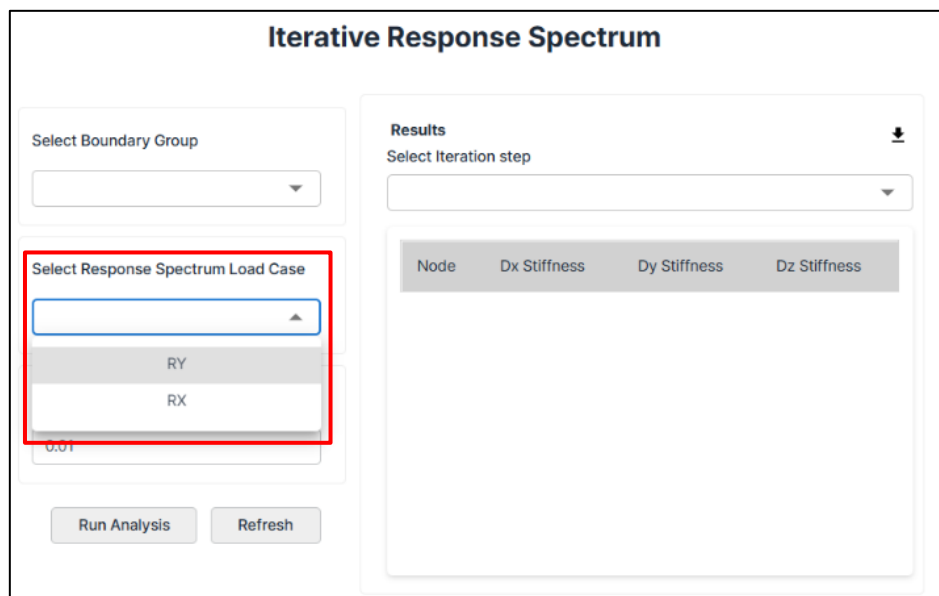
Run Analysis Refresh

Results

Select Iteration step

Node	Dx Stiffness	Dy Stiffness	Dz Stiffness
------	--------------	--------------	--------------

Step 4: Select one RS load case.



Iterative Response Spectrum

Select Boundary Group

Select Response Spectrum Load Case

RY

RX

0.01

Run Analysis Refresh

Results

Select Iteration step

Node	Dx Stiffness	Dy Stiffness	Dz Stiffness
------	--------------	--------------	--------------

Step 5: Enter tolerance

Note: '0.01 to 0.05' is indicative only.

Iterative Response Spectrum

Select Boundary Group

Select Response Spectrum Load Case

Tolerance (0.01 to 0.05)

0.01

Run Analysis

Refresh

Results

Select Iteration step

Node	Dx Stiffness	Dy Stiffness	Dz Stiffness
------	--------------	--------------	--------------

Step 6: Click 'Run Analysis'

Step 7: Output for all iteration can be downloaded in Excel format.

Iterative Response Spectrum

Select Boundary Group

Select Response Spectrum Load Case

Tolerance (0.01 to 0.05)

0.01

Run Analysis

Refresh

Results

Select Iteration step

Node	Dx Stiffness	Dy Stiffness	Dz Stiffness
------	--------------	--------------	--------------