Implicit Statistics – IMPLSTAT V2.0, in LSPP

IMPLicit STATistics in LSPP

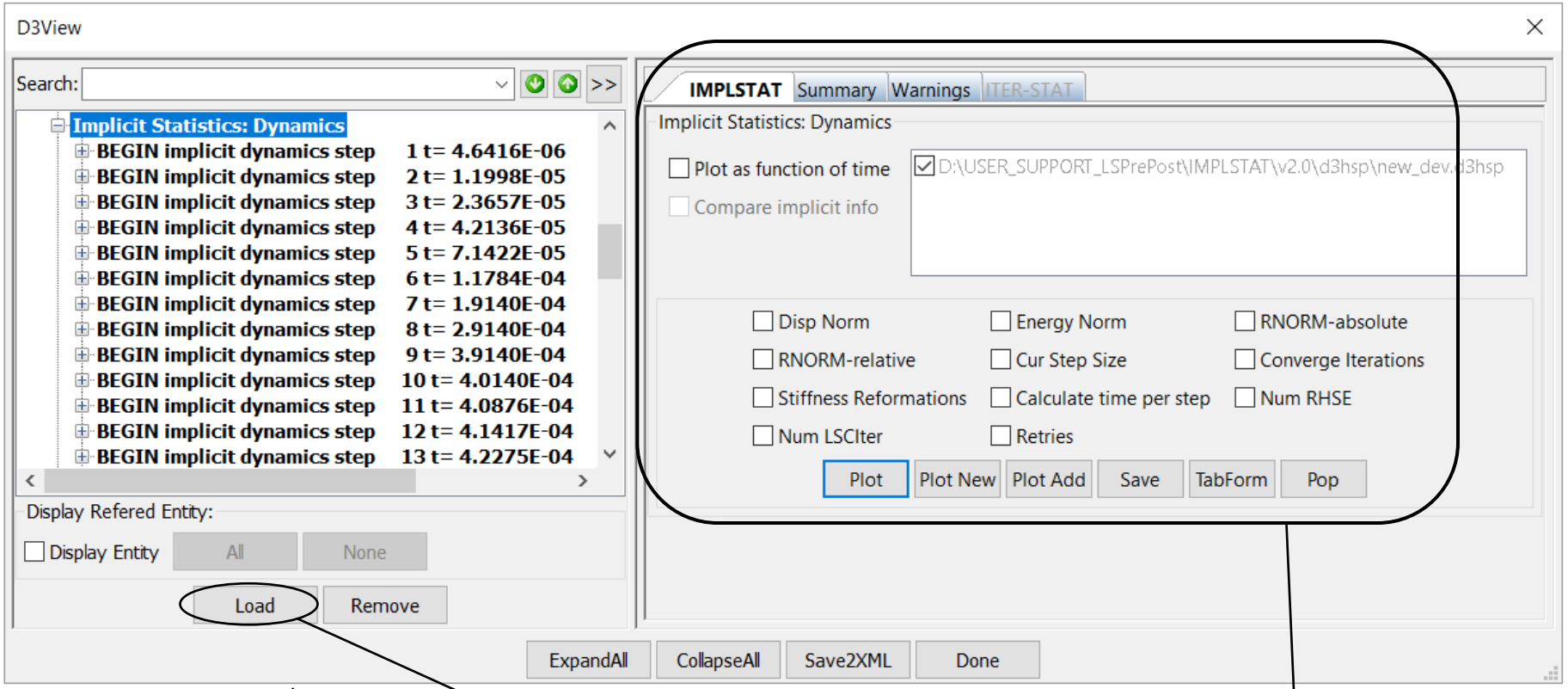
Output files (d3hsp and messag) written by LS-DYNA contains useful data, which is processed by this tool.

Using this information one can

- analyze the health of a solution
- get in-depth convergence information of a solution
- identify “trouble areas” or “areas of interest” that potentially influences the solution

Basically, one can use this tool to effectively debug a model and/or improve convergence efficiency.

IMPLSTAT GUI

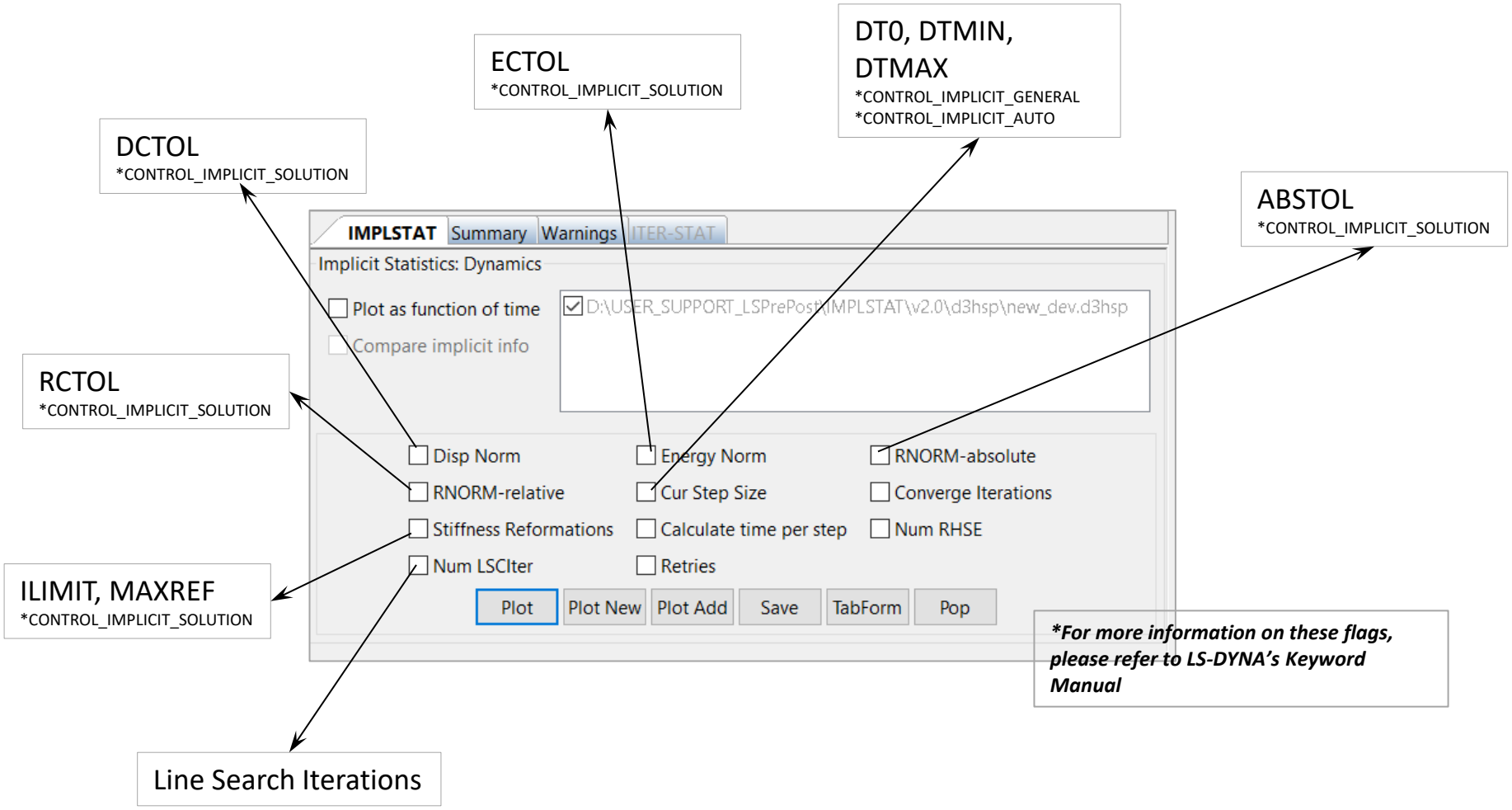


Click on “Load” to read a d3hsp file

Control Panel to IMPLSTAT

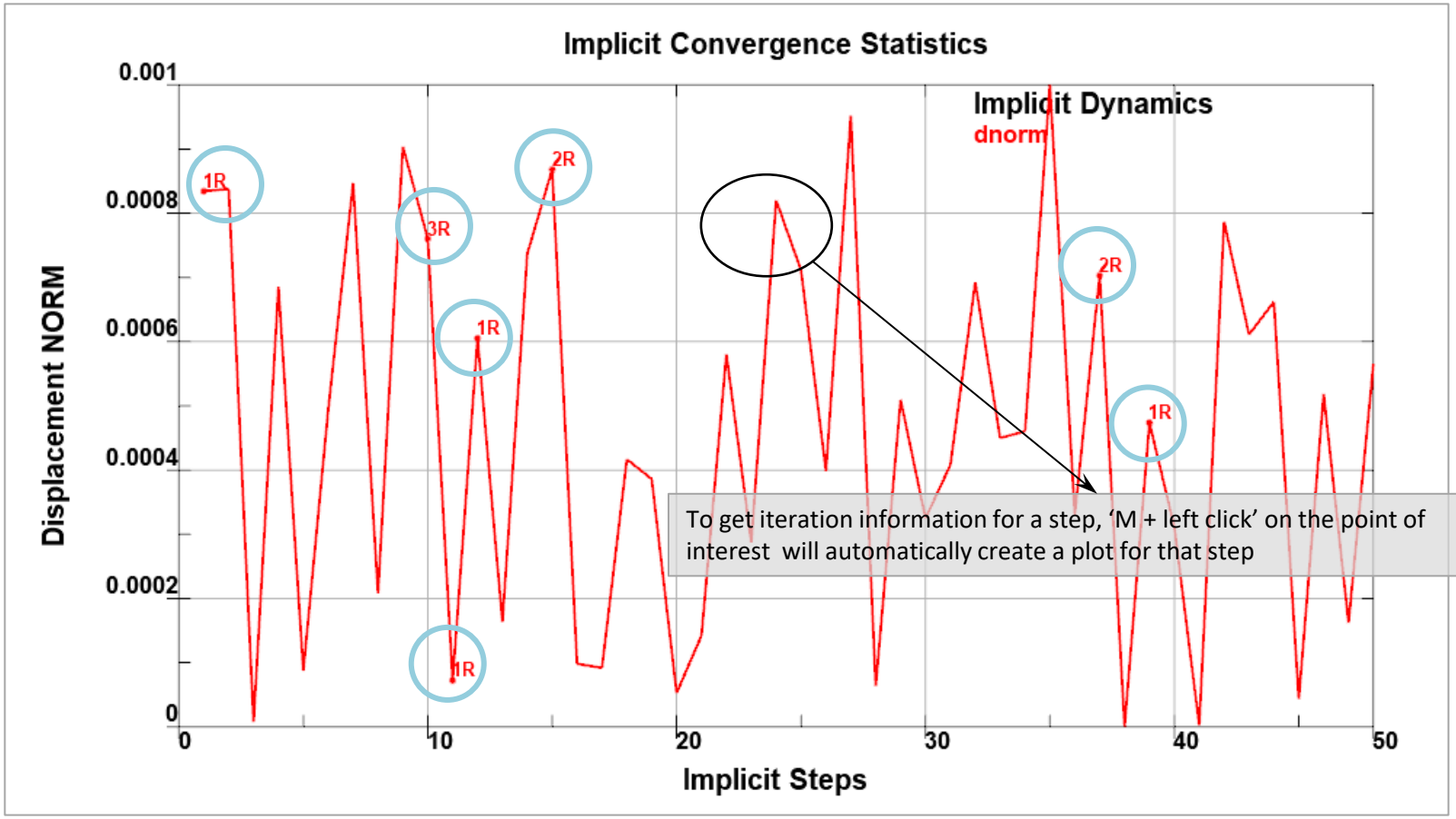
IMPLSTAT GUI is started from Misc->D3HSP View.

IMPLSTAT GUI



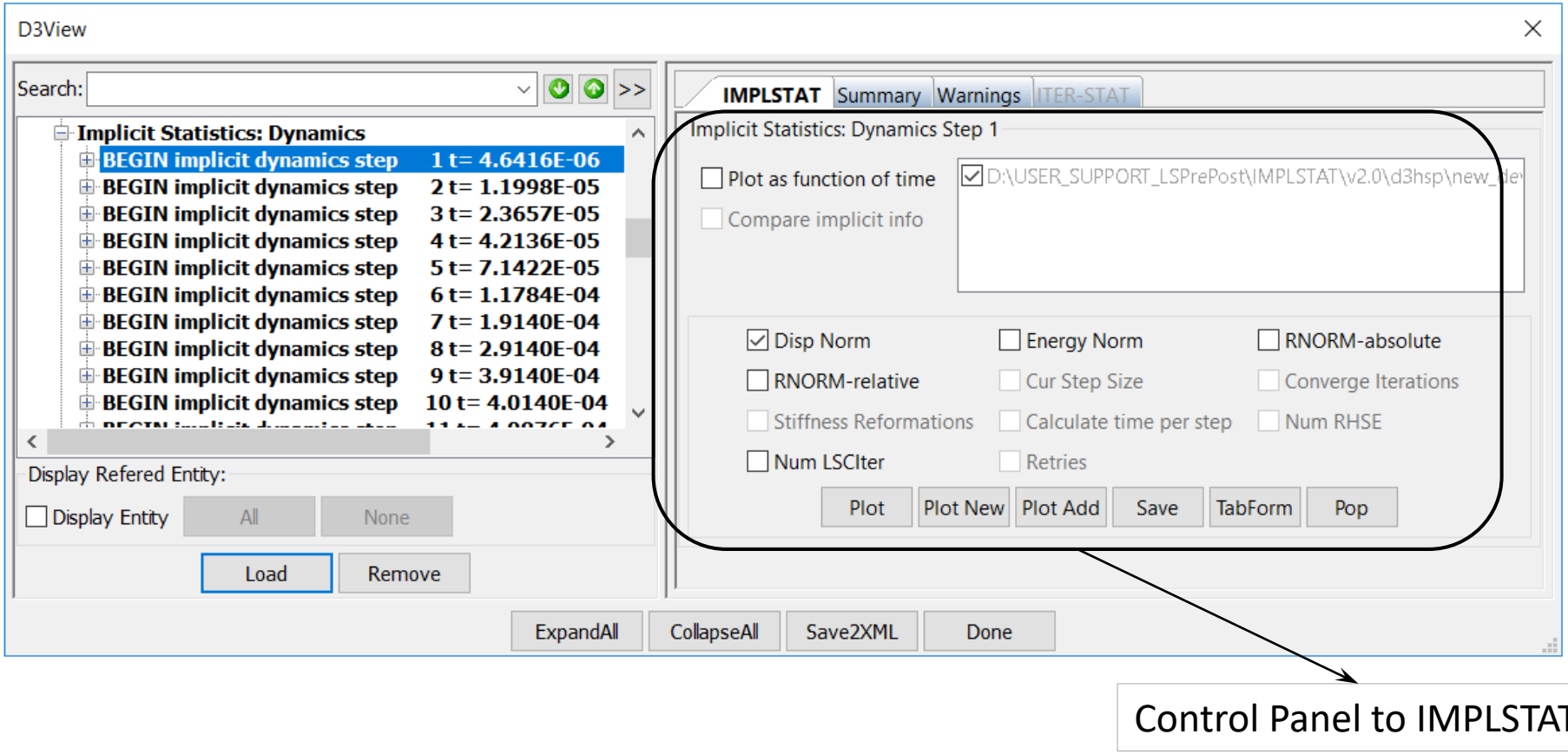
Flags and Keywords related to these outputs

IMPLSTAT GUI



Displacement Norm: DCTOL was set to 0.001.In the above plot DNORM is < 0.001 for every step, which means convergence was driven by this criteria

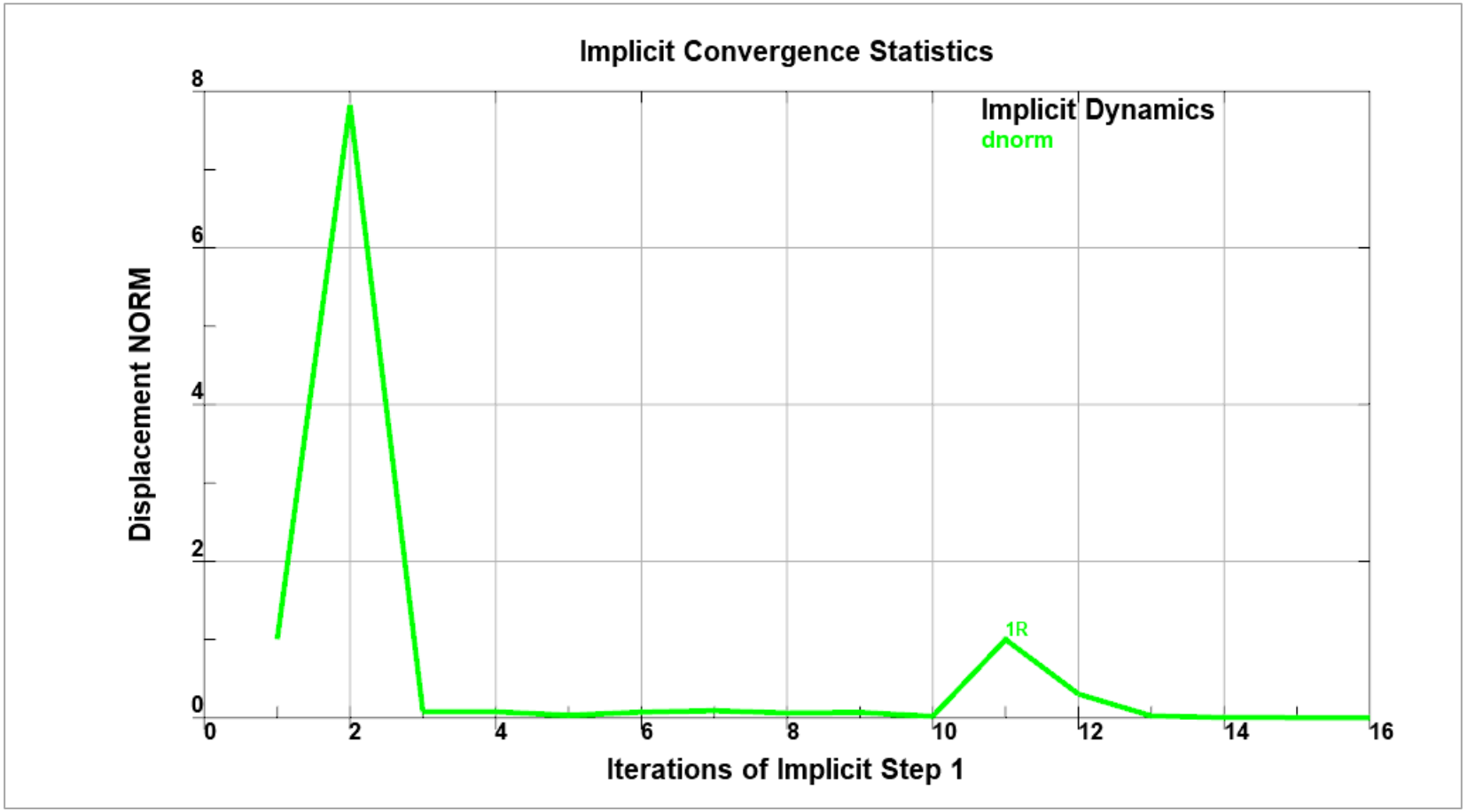
IMPLSTAT GUI



Control Panel to IMPLSTAT

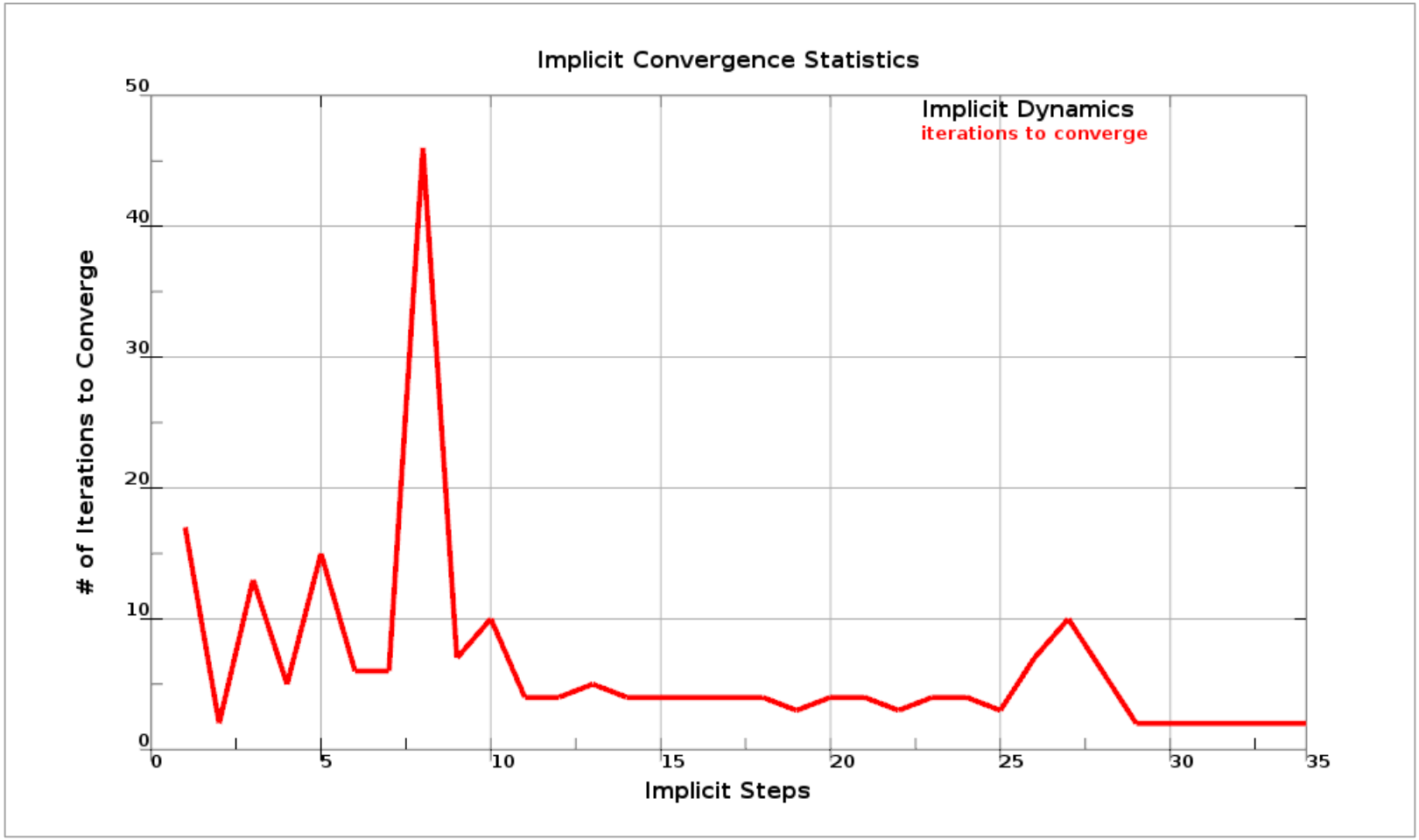
When we select a step, the control panel gets updated, quantities that are unavailable to plot are deactivated

IMPLSTAT GUI



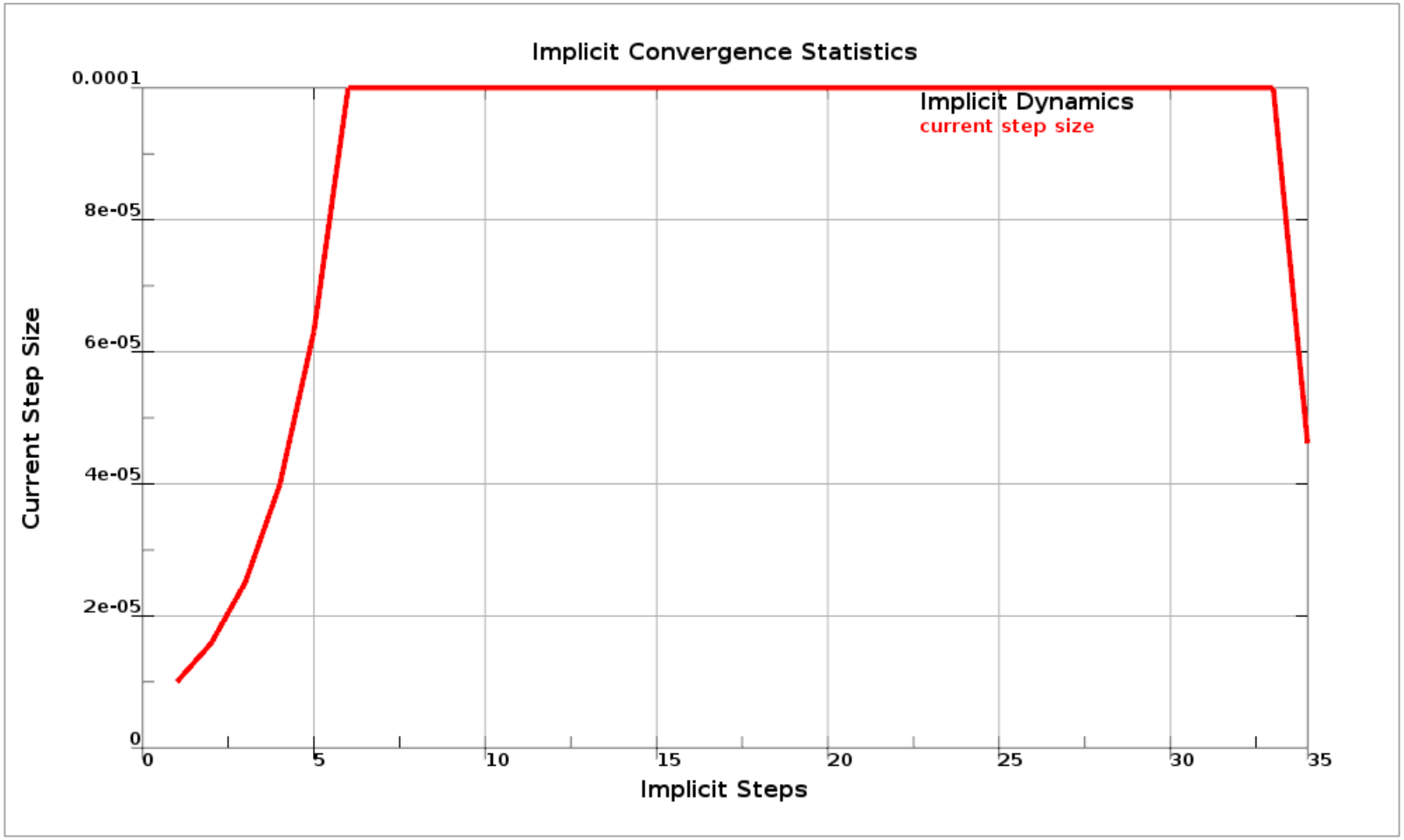
DNorm: Displacement norm for a step, helps understand how the norms are reducing

IMPLSTAT GUI



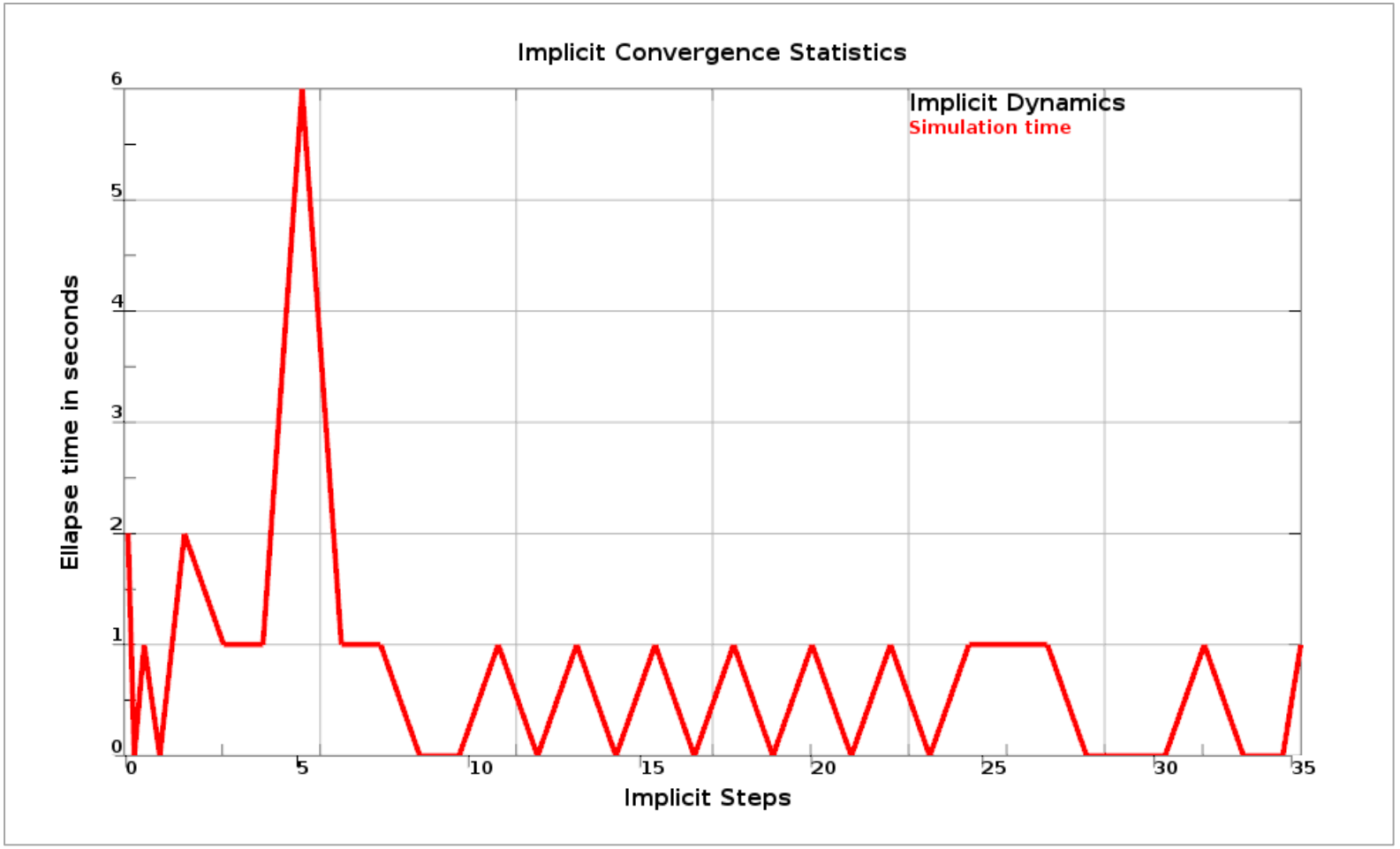
Iterations: “No. of Iterations per step” will give you a snapshot of the simulation. This can possibly help user uncover potential inefficiencies in the model.

IMPLSTAT GUI



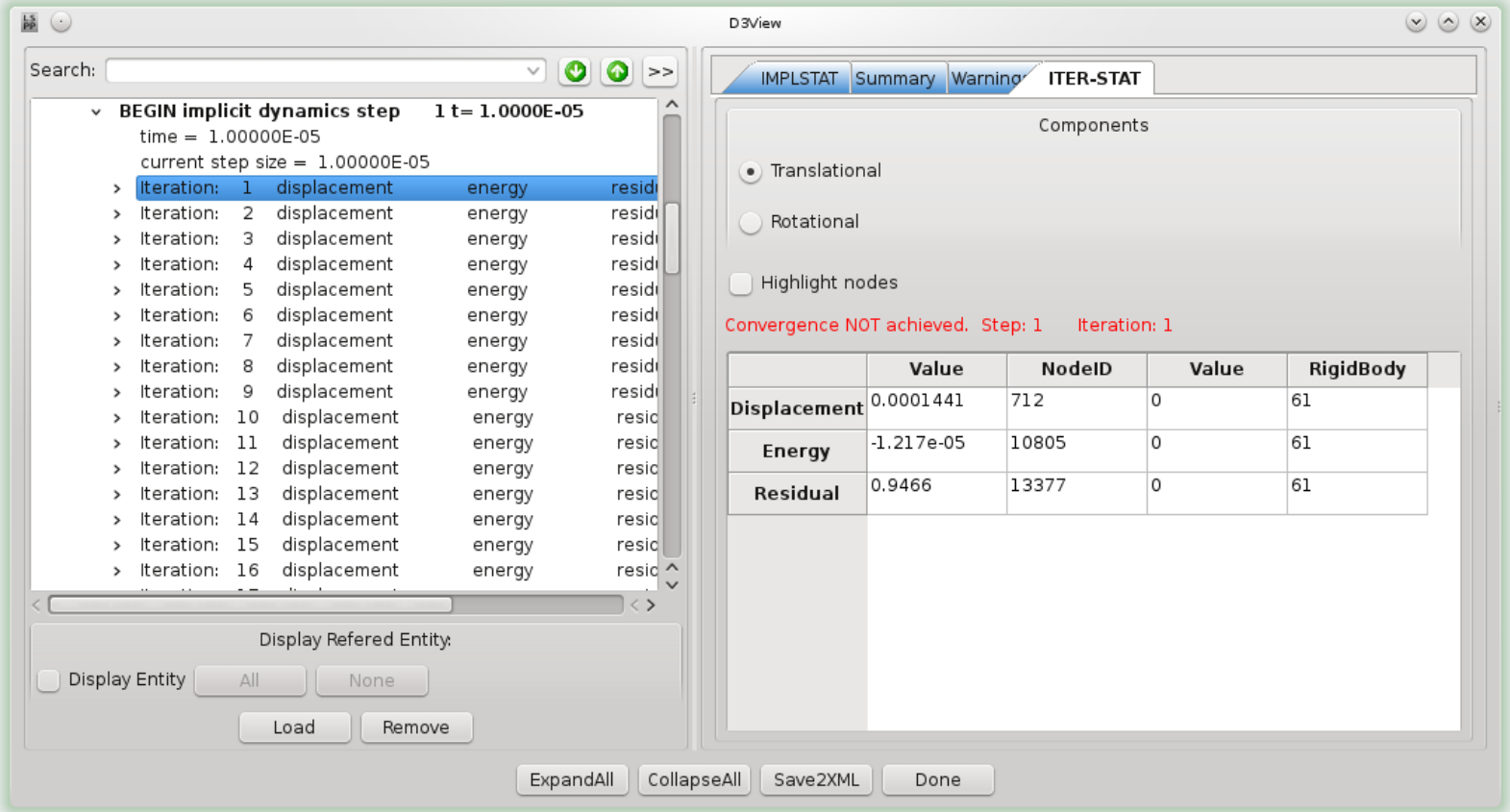
Step Size: To check evolution of implicit step size

IMPLSTAT GUI



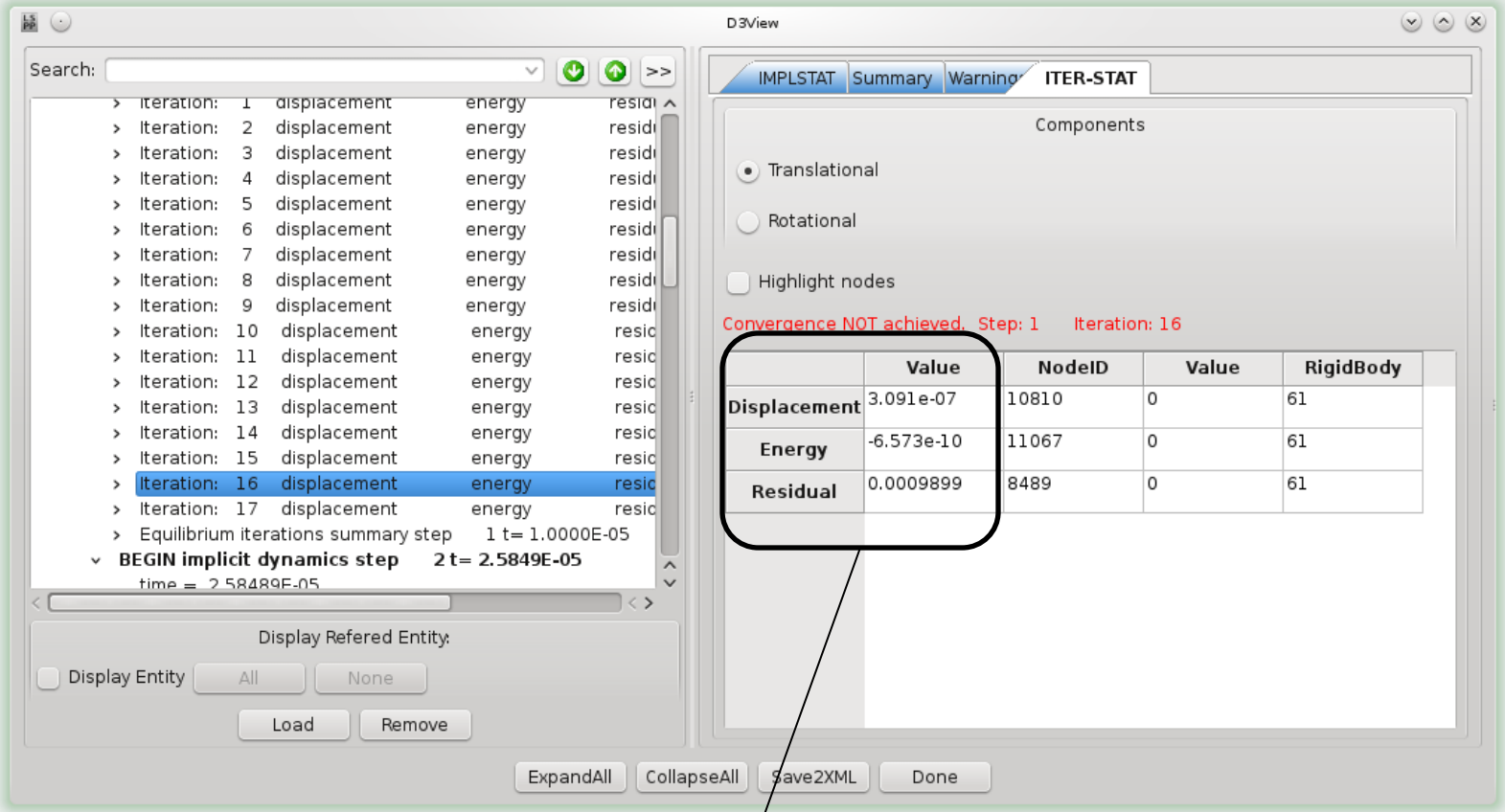
Wall Clock time per step: To check how much time was spent for each implicit step

IMPLSTAT GUI



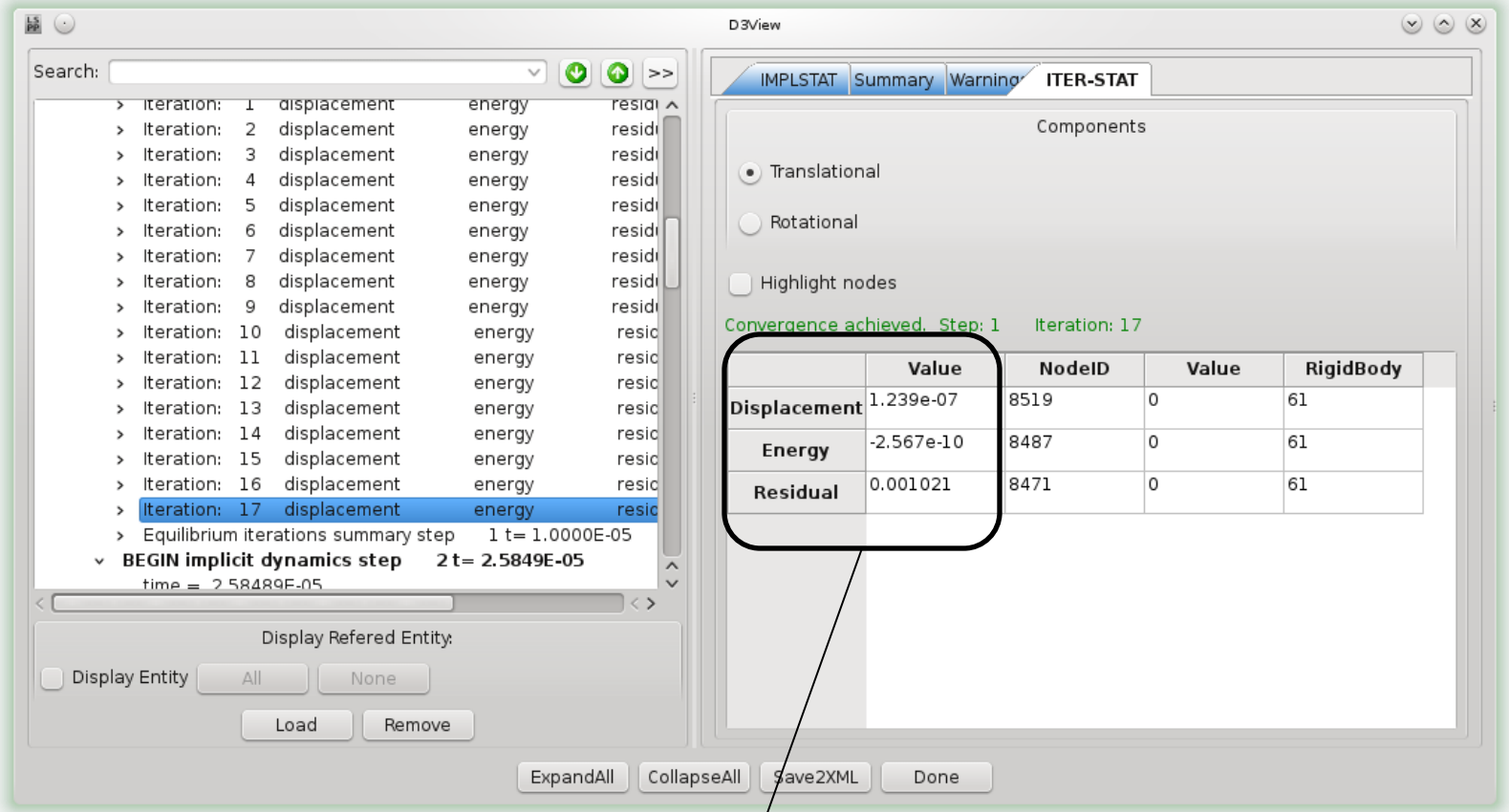
To get iteration details, select an **Iteration** and use ITER-STAT tab

IMPLSTAT GUI



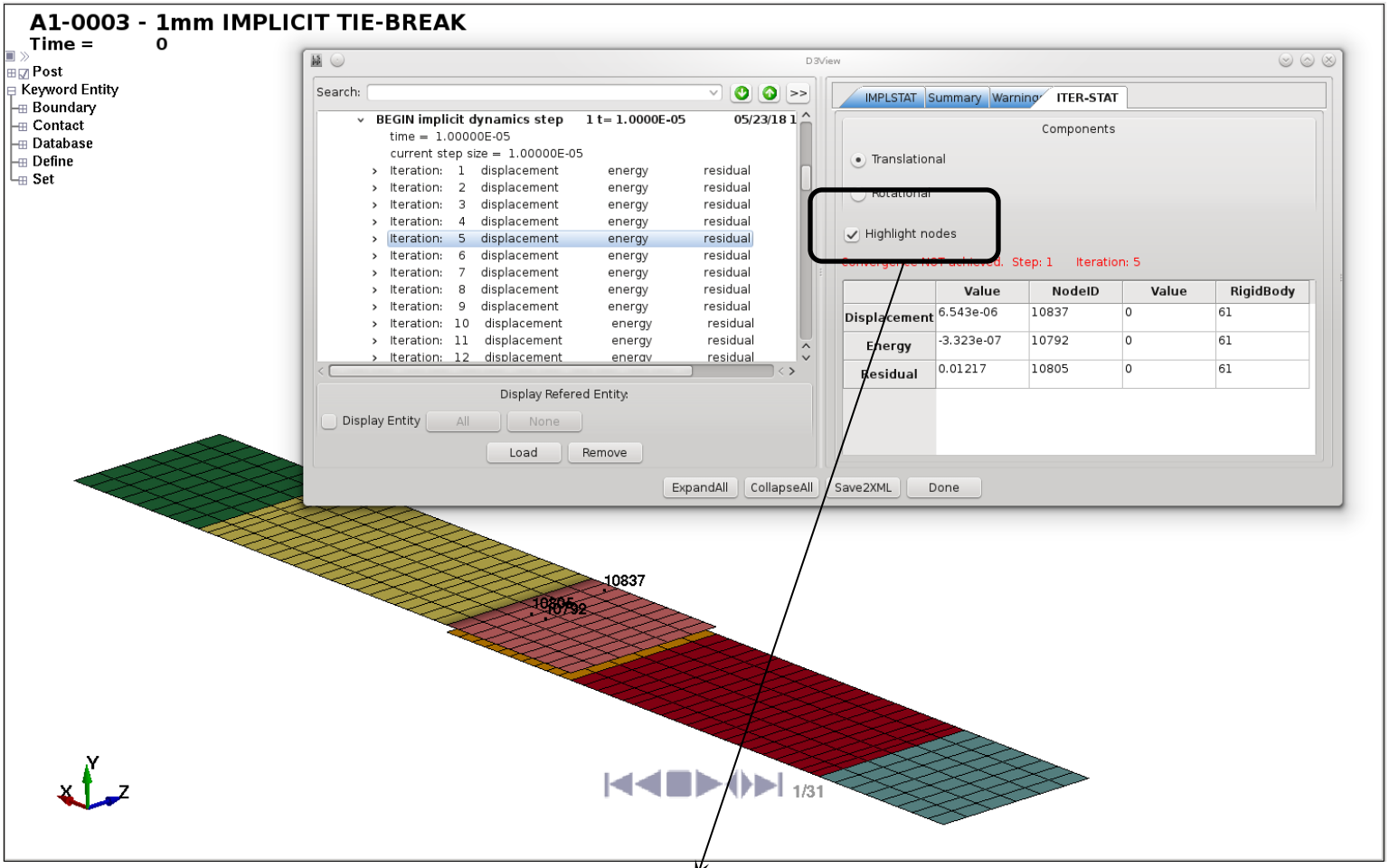
As we select higher iteration numbers, if the solution is being solved on a good path, one should expect the norm numbers to decrease from previous iteration.

IMPLSTAT GUI



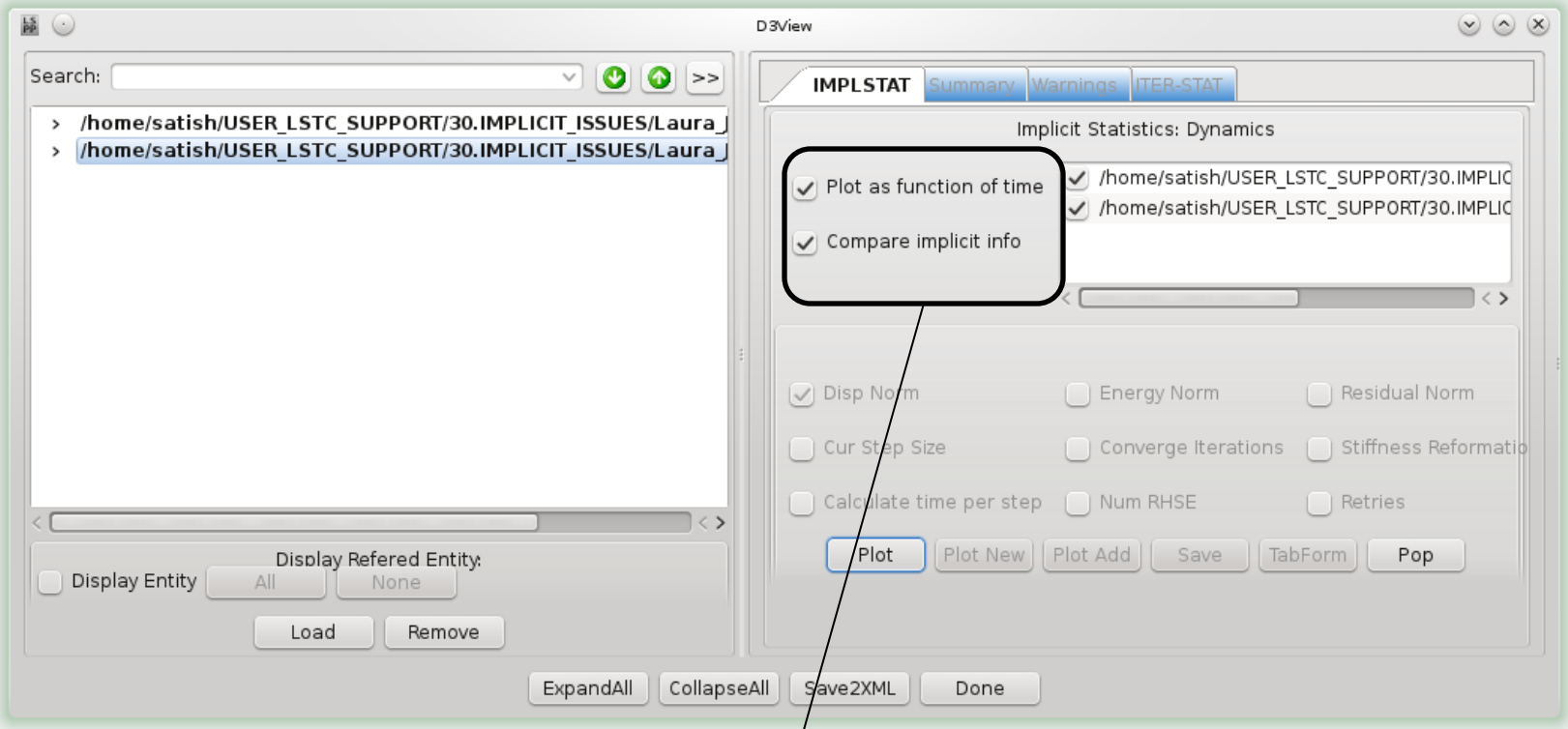
Converged iteration information

IMPLSTAT GUI



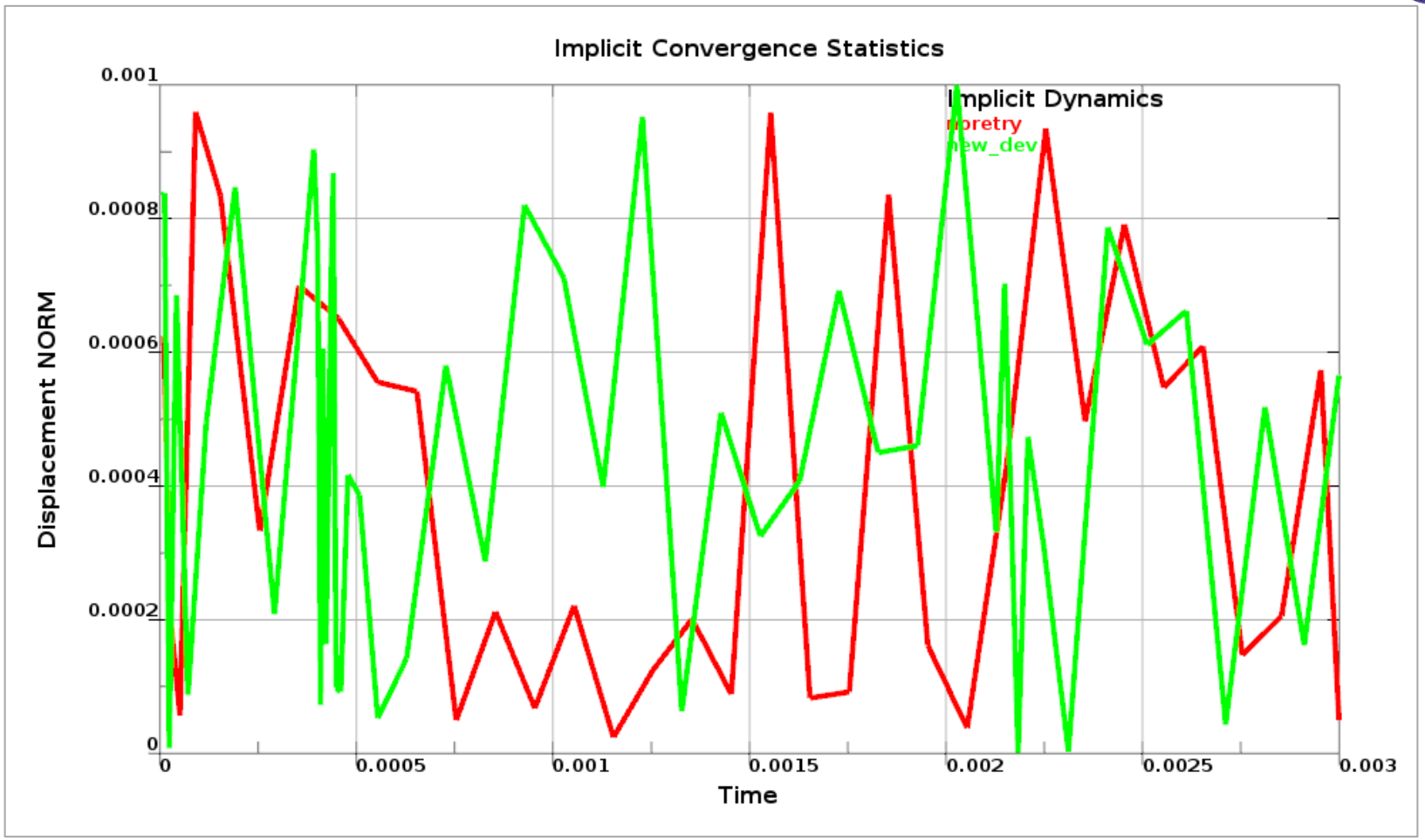
After you load a d3plot+keyword file, nodes that are most “active” during an iteration can be highlighted. Useful to understand which ‘area’ of the model is influencing convergence/solution

IMPLSTAT GUI



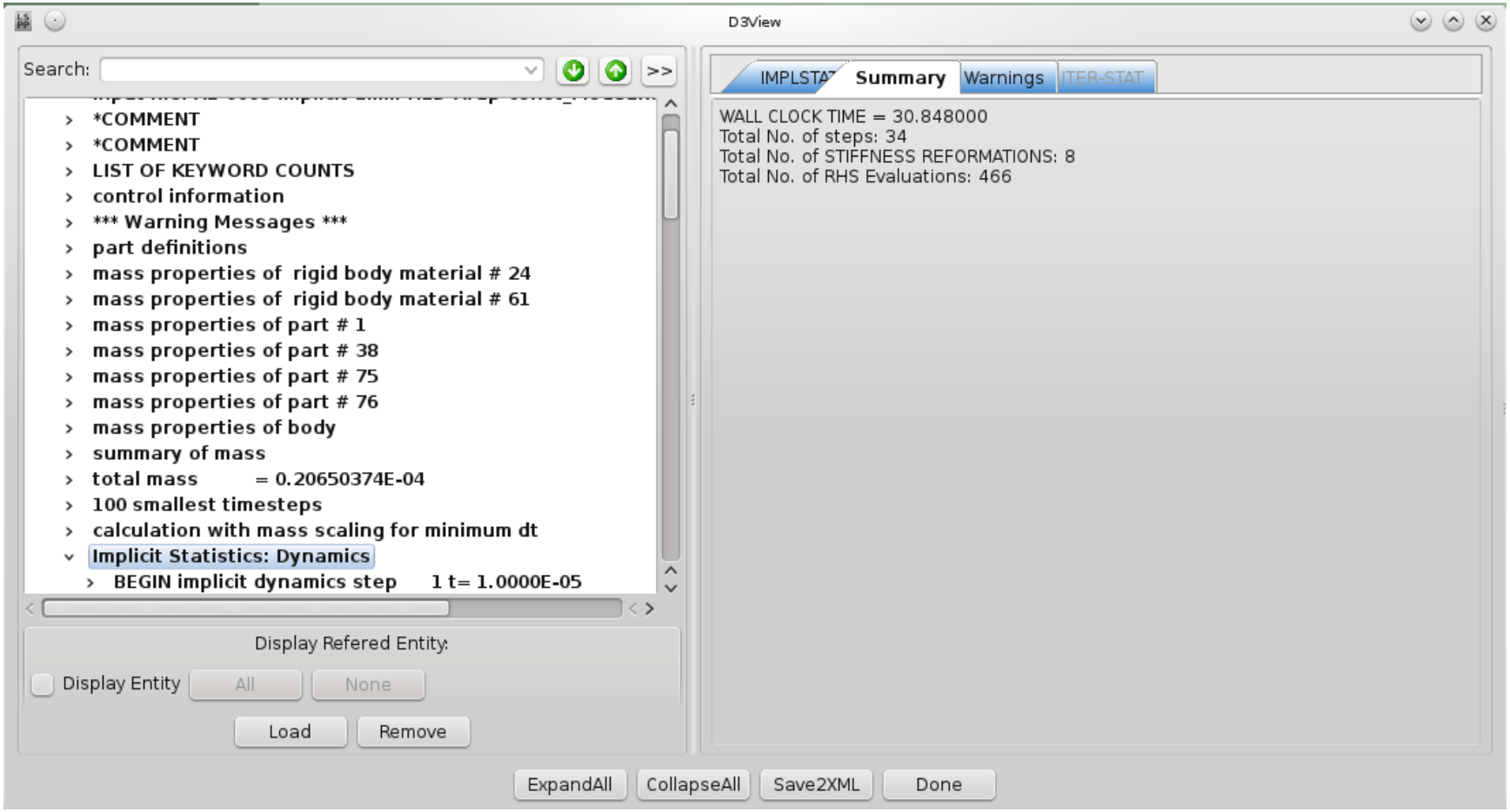
Comparing two simulations: Load all the d3hsps to compare, highlight “Compare implicit info” and “Plot as a function of time” and then click on “Plot”. All the quantities for both simulations will be generated. Since the number of steps/iterations required to solve two simulations may not be same, it is recommended to generate plots as a function of time.

IMPLSTAT GUI



Displacement Norm comparison between two runs

IMPLSTAT GUI



A quick summary for a run, global picture

IMPLSTAT GUI

Future Work -

- We are still adding logic to collect more ‘Warnings’ and list them
- Refining the visualization further
- Review and incorporate feedback as we receive them