



Query over Time

## INTRODUCTION

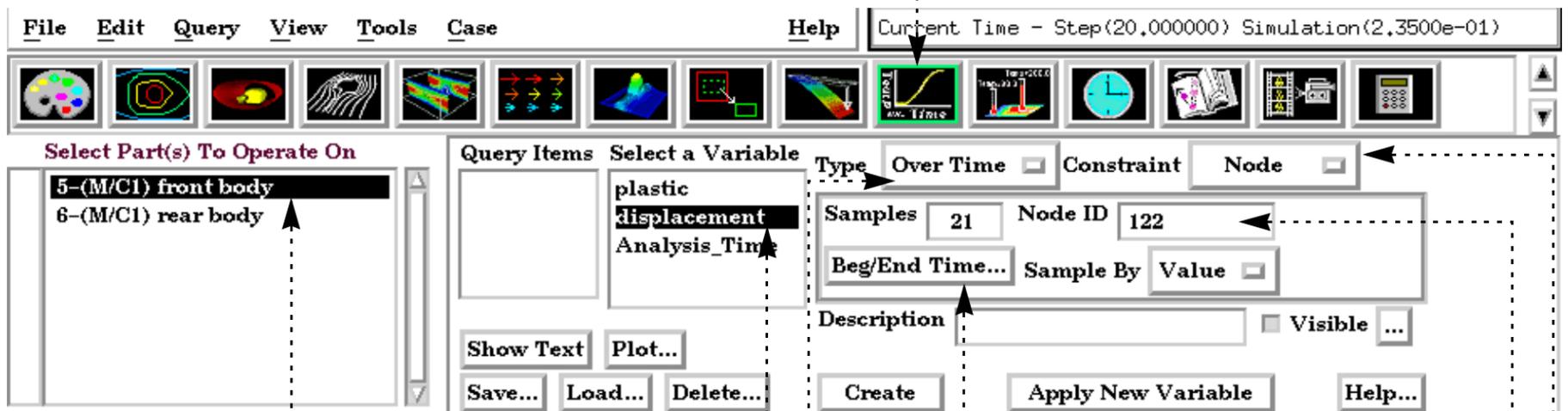
For transient datasets, EnSight can query for variable values over a range of time at a particular node or element (or specific IJK coordinate for structured data) or an arbitrary point. You can also search for the minimum or maximum of a variable over all nodes over a time range. Query results can be quickly displayed using EnSight's built-in **plotter**.

## BASIC OPERATION

### Query Over Time at a Node

To perform a time-based query operation at a node:

2. Click the Query/Plot icon (or select Query > Over Time/Distance...).



1. Select the part to query.

3. Select the node-based variable to query.

4. Set the Type pulldown to Over Time.

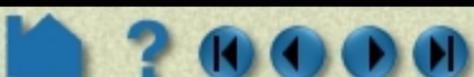
5. Set the Constraint pulldown to Node.

6. Enter the ID number of the desired node.

7. If you wish to restrict the time range, click here to open the Solution Time Quick Interaction area; set the time range and then return to the Query/Plot Quick Interaction area.

8. Click Create.

The entry for Samples and the Sample By pulldown are described in the Advanced Usage section below.





## Query Over Time at an Element

Individual elements can also be queried over time.

Performing a query over time at an element is nearly identical to a node query over time.

1. Perform steps 1-4 as described above for a node query.
2. Set the Constraint to Element.
3. Enter the desired Element ID.
4. Click Create.

Query Items: [Empty]

Select a Variable: plastic, **displacement**, Analysis\_Time

Type: Over Time  Constraint: Element

Samples: 1 Element ID: 1

Beg/End Time... Sample By: Value

Description: [Empty] Visible:  ...

Show Text Plot... Save... Load... Delete... Create Apply New Variable Help...

## Query Over Time at a Point

The Cursor Tool is used to provide the location for a query over time at a point.

Performing a query over time at a point is nearly identical to a node query over time.

1. Perform steps 1-4 as described above for a node query.
2. Set the Constraint to Point.
3. Position the [Cursor Tool](#) as desired.
4. Click Create.

Query Items: [Empty]

Select a Variable: plastic, **displacement**, Analysis\_Time

Type: Over Time  Constraint: Point

Samples: 11 Point/Cursor Location... [Empty]

Beg/End Time... Sample By: Value

Description: [Empty] Visible:  ...

Show Text Plot... Save... Load... Delete... Create Apply New Variable Help...

## Query Over Time at an IJK Coordinate

Structured parts can be queried at specific IJK coordinate locations.

Performing a query over time at an IJK position is nearly identical to a node query over time.

1. Perform steps 1-4 as describe above for a node query.
2. Set the Constraint to IJK.
3. Enter the desired IJK coordinate.
4. Click Create.

Query Items: [Empty]

Select a Variable: plastic, **displacement**, Analysis\_Time

Type: Over Time  Constraint: IJK

Samples: 11 I 1 J 1 K 1

Beg/End Time... Sample By: Value

Description: [Empty] Visible:  ...

Show Text Plot... Save... Load... Delete... Create Apply New Variable Help...

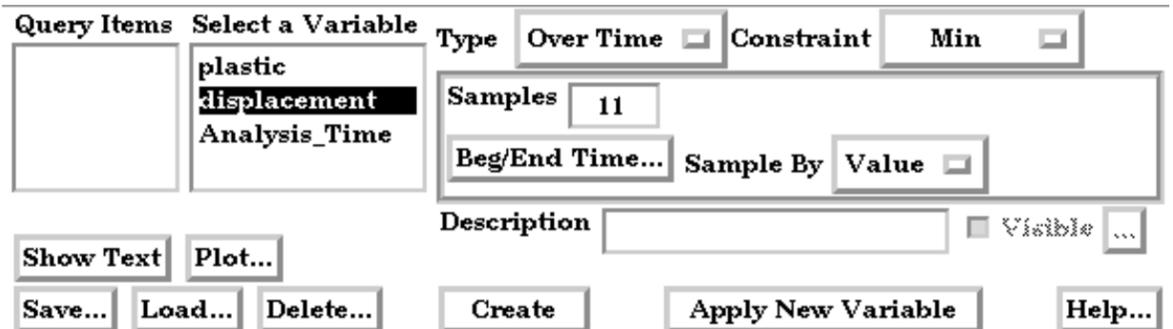


## Query for Min/Max Over Time

A minimum/maximum query will report the minimum/maximum values (including the location) for a variable for each time step in the current time range. The overall minimum/maximum is also reported.

Performing a minimum/maximum query over time is nearly identical to a node query over time.

1. Perform steps 1-4 as describe above for a node query.
2. Set the Constraint to Min or Max.
3. Click Create.



## Managing Query Entities

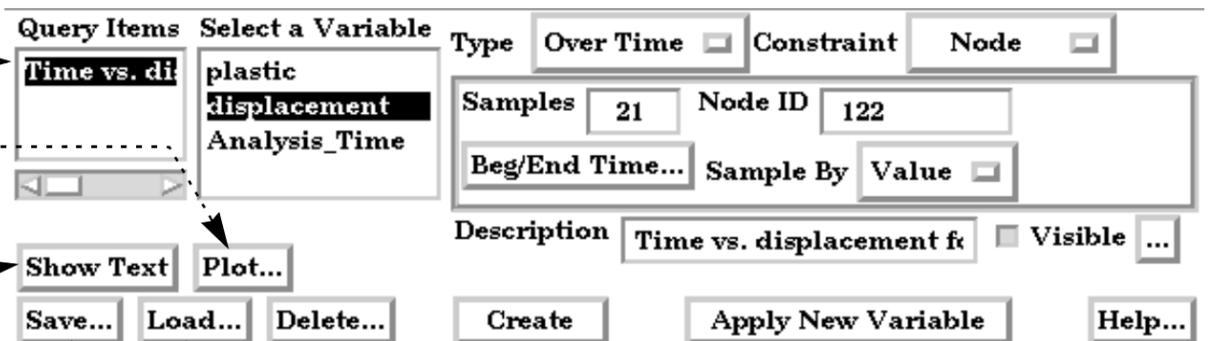
The Quick Interaction area provides various controls for managing existing Query Entities:

List of current Query Entities.

Selected items are operated on by the following actions.

Plot the selected Query Entity.

Print the text of the selected Query Entity to the Status History Area.



Save the selected Query Entity to a disk file.

Load from a previously saved Query Entity.

Delete the selected Query Entity.

Change the query variable (select the new variable in the Main Variables list first) of the selected Query Entity.

## ADVANCED USAGE

By default, EnSight performs the requested query operation for each time step in the current time range. You can also perform queries that sample the variable between time steps or skip over time steps. For samples between time steps, EnSight will linearly interpolate the applicable values from the two surrounding time steps. Note that you *cannot* perform a query that samples between time steps if your geometry is transient (*i.e.* the set of elements and/or element connectivity is changing over time).

The values of the Samples field controls time sampling. For example, if you have 10 time steps and you set Samples to 5, the query will be performed at steps 1, 3, 5, 7, and 9. If you set Samples to 19, the query will be performed at steps 1, 1.5, 2, 2.5, 3, ..., 9, 9.5, and 10.

For periodic phenomena, it is sometimes useful to study the frequency distribution of a variable over time. EnSight can calculate a Fast Fourier Transform (FFT) of the query results at the positive frequencies. To calculate the FFT, set the Sample By pulldown to FFT prior to creating the Query Entity.



You can load arbitrary plot data into EnSight (using the Load... button) no matter where it was computed – as long as you conform to the proper file format. This is particularly useful when you need to compare experimental data with computational results. See [XY Plot Data Format](#) in the User Manual for a description of the plot file format.

## SEE ALSO

[How To Query Over Distance](#), [How To Probe Interactively](#), [How To Plot Query Results](#).

User Manual: [Query/Plot](#)

