*Chapter 5*
INSTED®/CFD (2D) Post-Processor

The Post-Processor part of INSTED/CFD (2D) plots lines or filled contours of variables such as velocities, temperature, pressure, scalars, and stream function. The program also produces vector plots of the velocity solutions as well as an *x-y* graph of Nusselt number distribution along prescribed regions of the model geometry. These boundary regions would have been specified during mesh generation. In addition, the post-processor produces *x-y* graphs of the time-history of the variables for sample points selected during the solution phase. Note that INSTED post-processor has full 3-D capability. That is, it allows 3-D views, rotations and transformation of the object. It also provides a printer ready format for presentation of results, which may be saved as bitmap files or sent directly to the printer.

Post-Processor

5.1 INSTED Post-Processor Interface

INSTED Post-processor is organized into eight dialog boxes - the Main dialog box, Graphics, Control, Vector, Contour, Axis, Display Controls, and Multiple Views dialog boxes.
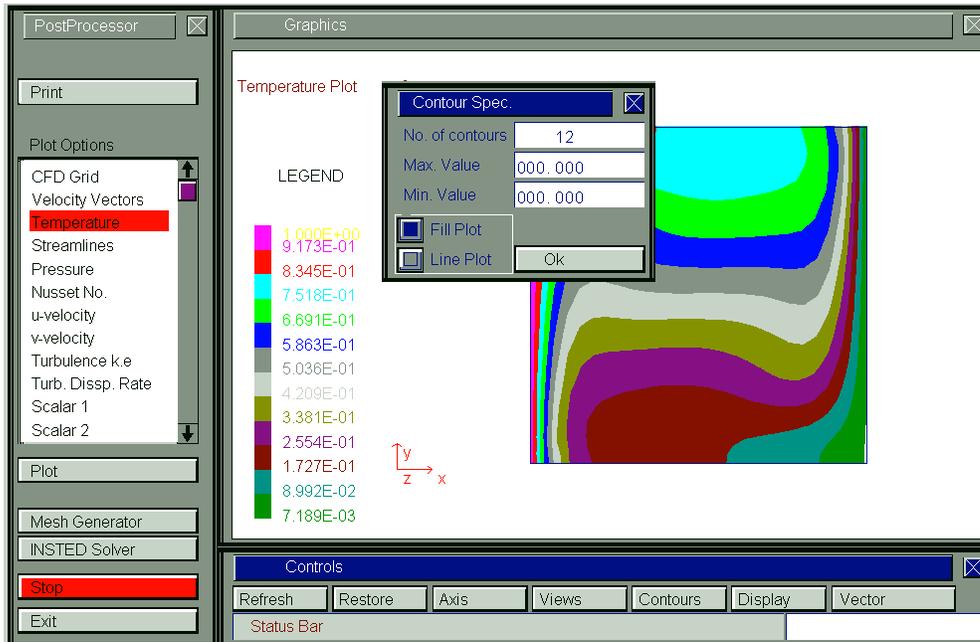
Main dialog box   Graphics dialog box
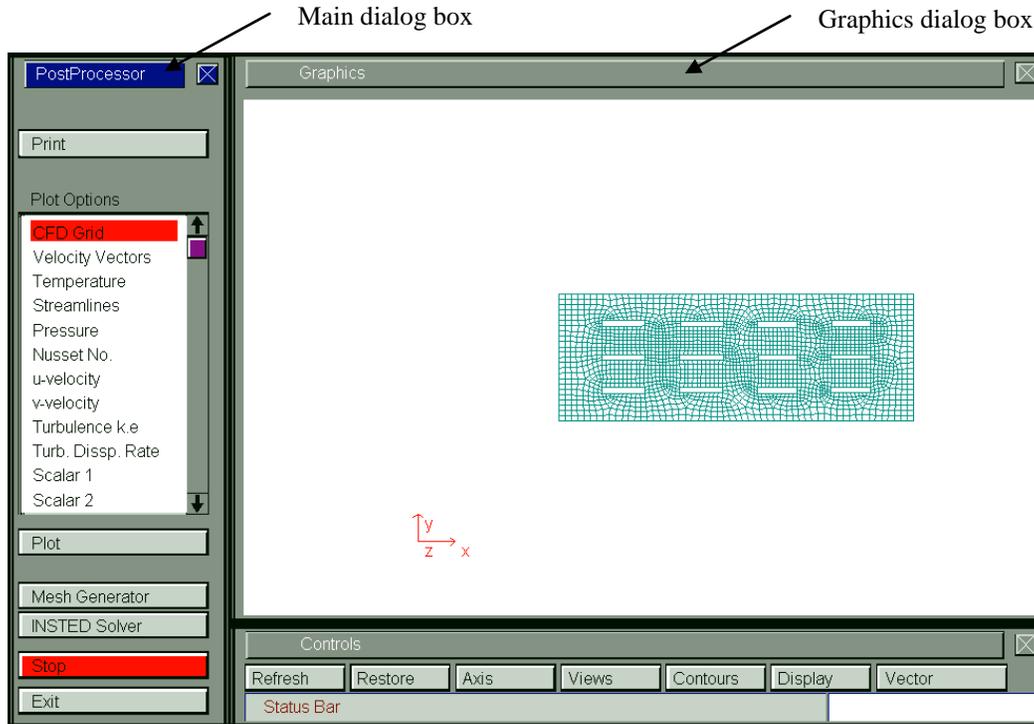
5.2 Plotting Contour Files with INSTED/CFD

- From the list in the 'Plot Options' listbox, which resides on the Main dialog box, select a contour plot option such as Pressure, Temperature, *u*-velocity, etc.
- Click the **Plot** button on the Main dialog box
→ A contour plot of the selected variable is presented in the Graphics dialog box

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5.2.1 Selecting between line and filled contours

The default contour plot type is a line plot. However, you may choose between line and filled contour plots from the 'Contour Spec.' dialog box shown in the figure below.

This dialog box may be invoked by clicking the **Contours** button form the 'Controls' dialog box.

5.2.2 Changing the number of contour levels

The number of contour levels can also be selected from this dialog box by changing its value. The maximum allowed is 12.

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5.3 Obtaining Vector Plots

- From the list in the 'Plot Options' listbox, which resides on the Main dialog box, select the 'Velocity Vectors' option
- Click the **Plot** button on the Main dialog box
- → A vector plot of the *u*- and *v*- velocity solutions is presented in the Graphics dialog box

5.3.1 Changing the relative vector length

The relative vector length may be modified from the 'Vector Spec.' dialog box. This dialog box may be obtained by clicking the **Vector** button from the 'Controls' dialog box.
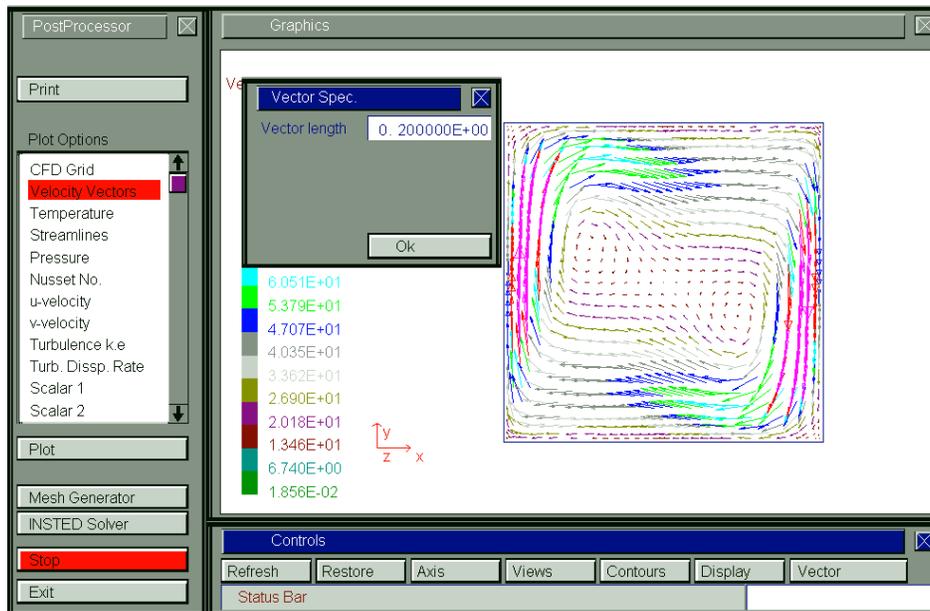
5.4 Obtaining Nusset Number Plots from INSTED

A plot of the distribution of Nusset number along lines specified during mesh generation may be obtained with the Post-processor. To obtain a Nusset number plot, follow the procedure below:

- From the list in the 'Plot Options' listbox, which resides on the Main dialog box, select the 'Nusset No.' option
- Click the **Plot** button on the Main dialog box
→ A plot of the Nusset number distribution is presented in the Graphics dialog box

5.5 Obtaining Time-History Plots from INSTED

A time-history of the solution for the u-velocity, v-velocity, and temperature may be plotted in the post-processor. The points of interest must have been selected during the solution phase. To obtain the plot of time-history data, follow the procedure below:
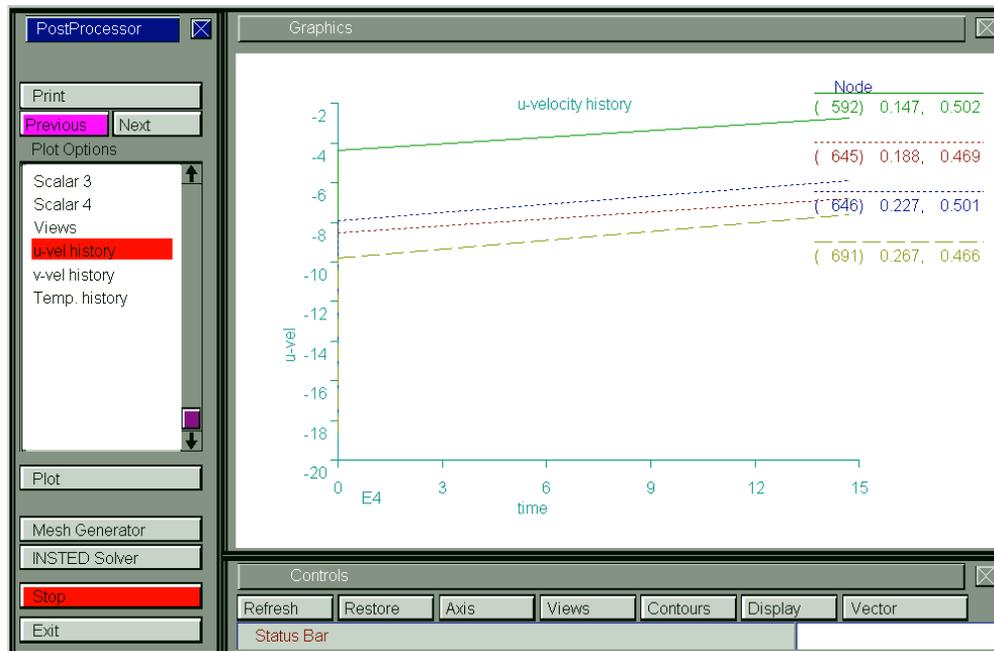
- From the list in the 'Plot Options' listbox, which resides on the Main dialog box, select either the 'u-vel history', 'v-vel history' or the 'Temp. history' option
- Click the **Plot** button on the Main dialog box
→ A plot of the history of temperature solution along selected nodal points is presented in the 'Graphics' dialog box. A **Previous** and **Next** navigation button also appears above the 'Plot Options' listbox as shown in the figure above
- Change between the pages of the graphs for the sample point solution history by clicking on these navigation buttons

5.6 Creating Multiple Plots in INSTED/CFD

INSTED post-processor allows two plots to be displayed simultaneously, for instance, for comparing between subsequent plots of the same variable in time or comparing two variables. This is illustrated in the figure below. To obtain a multiple view plot, follow the procedure below:

- From the list in the 'Plot Options' listbox, which resides on the Main dialog box, select the 'Views.' option
→ A 'Multiple Views' dialog box appears
- Select two different views and time steps from this dialog box

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- Click the **Ok** button on the 'Multiple Views' dialog box
→ A plot of two selected options is presented in the Graphics dialog box
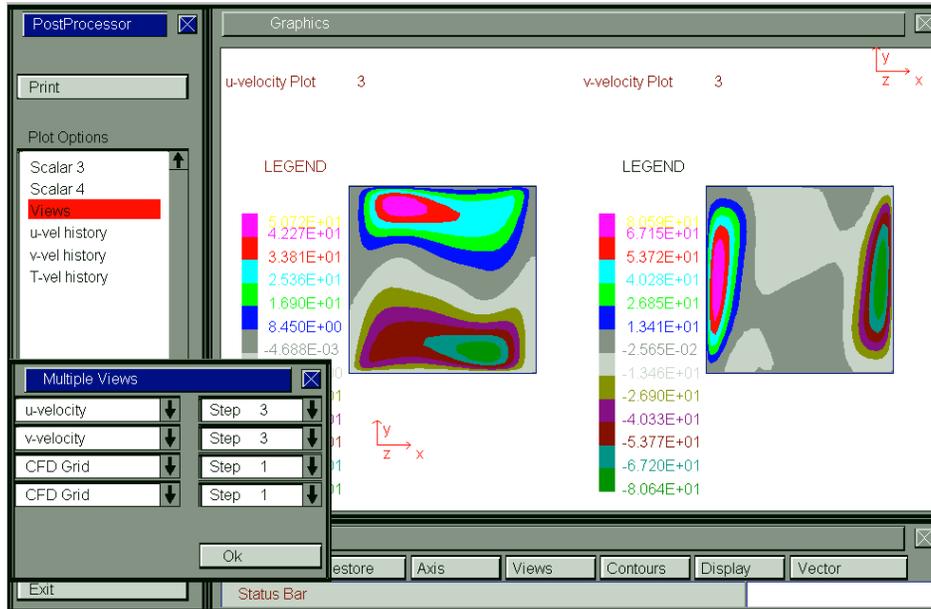

5.7 Displaying Nodal, Element Labels in INSTED

INSTED Post-processor allows the labeling of nodes - with solution values or node numbers - as well as the display of element numbers. These options can be selected from the 'Display Controls' dialog box. This dialog box may be invoked by clicking the **Display** button on the 'Controls' dialog box.

### 5.7.1 Selecting the time-step for viewing

The frequency of print variables specified in the scalar environment allow solution to be stored at a regular interval of time. During post-processing, you may then choose to display the result at any particular print step. The print step may be selected from the

'Display Controls' dialog box. This dialog box may be invoked by clicking the **Display** button on the 'Controls' dialog box. The print step is then selected from the listbox. This listbox resides at the bottom of the 'Display Controls' dialog box. The default print-step is the first, which, depending on the frequency of print, does not usually contain useful information in a transient calculation.
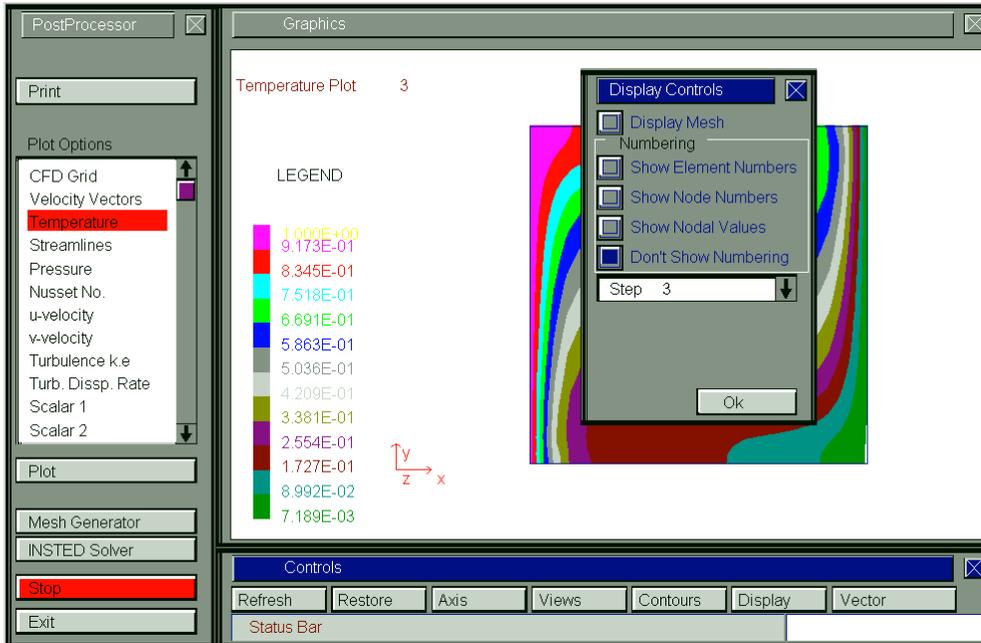
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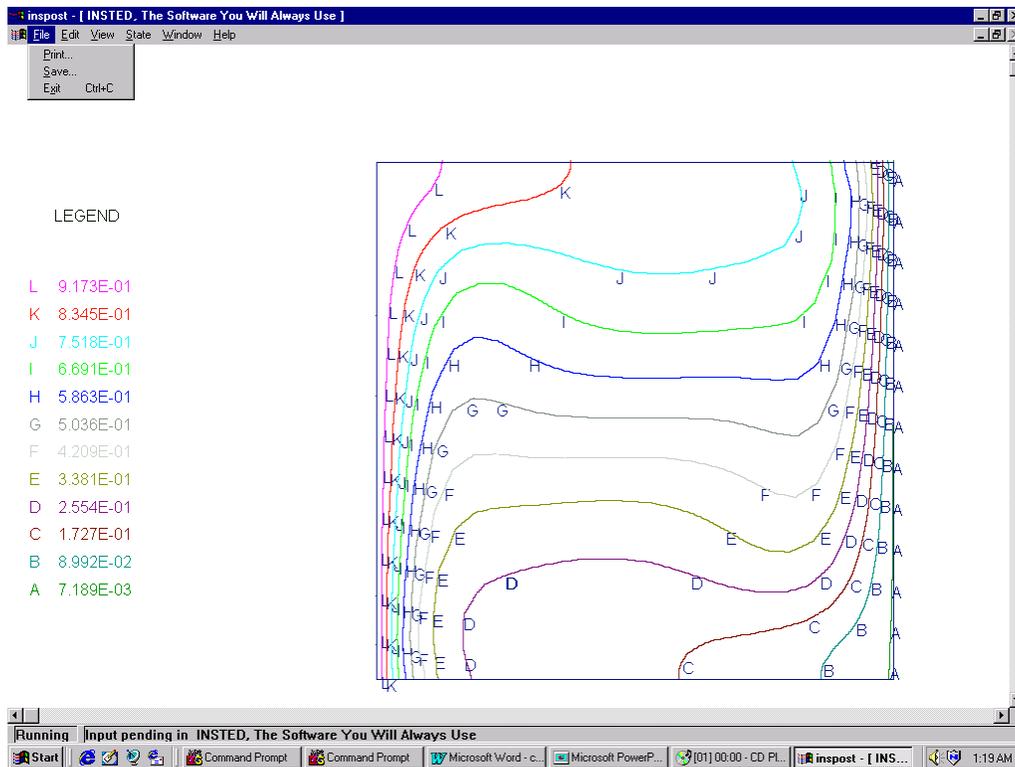**5.8 Performing Rotations and Scaling in INSTED**

Rotations and scaling may be done in the 'Axis' dialog box. This dialog box is obtained by clicking the **Axis** button on the 'Controls' dialog box.
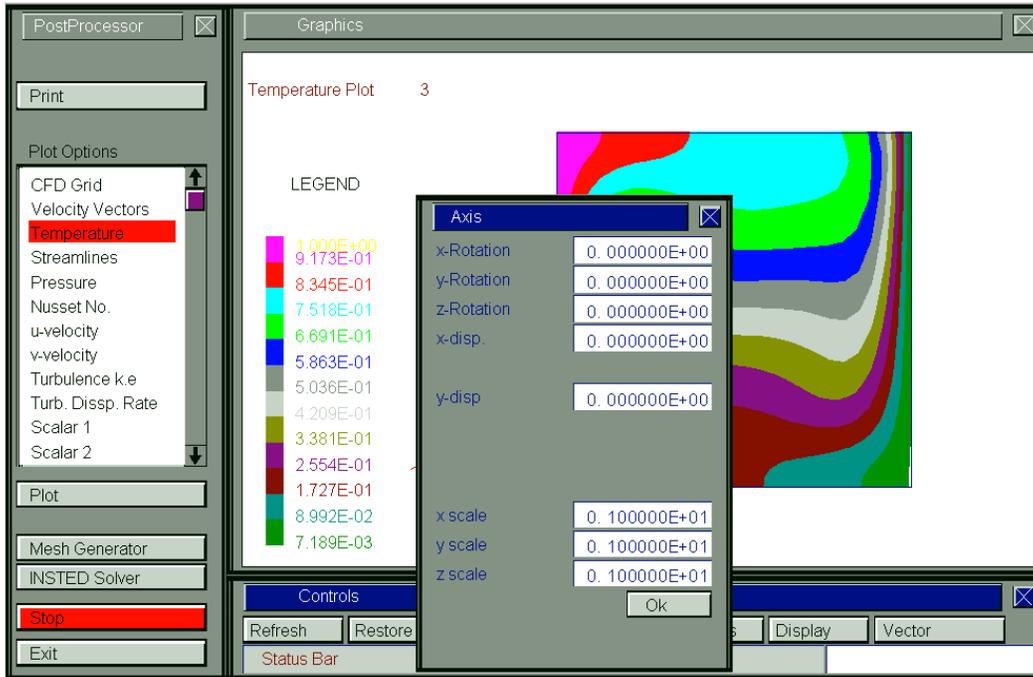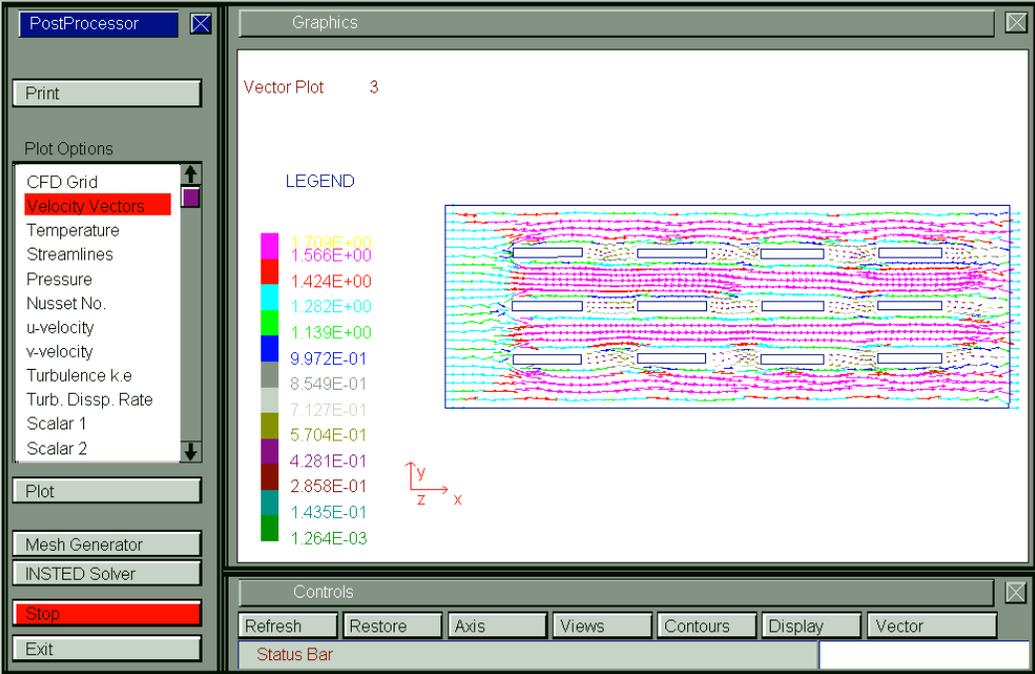
5.9 Printing or Saving INSTED Post-processor Pictures

INSTED/CFD provides the means to format any picture presented in the 'Graphics' dialog box for printing. Clicking the **Print** button on the Main dialog box presents a printer-ready version of the picture in the 'Graphics' dialog box. Files can be saved as bitmap files or sent to printer. To print or save this picture, follow the procedure below:

- Click the **Print** button on the Main dialog box
- From the File menu at the top left of the screen, select either 'Print' or 'Save…'
- A printer dialog box or 'Save As' dialog box is presented. Follow normal operating system procedures to print or save the picture
- Click on any portion of the screen to return to the INSTED Postprocessor interface

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