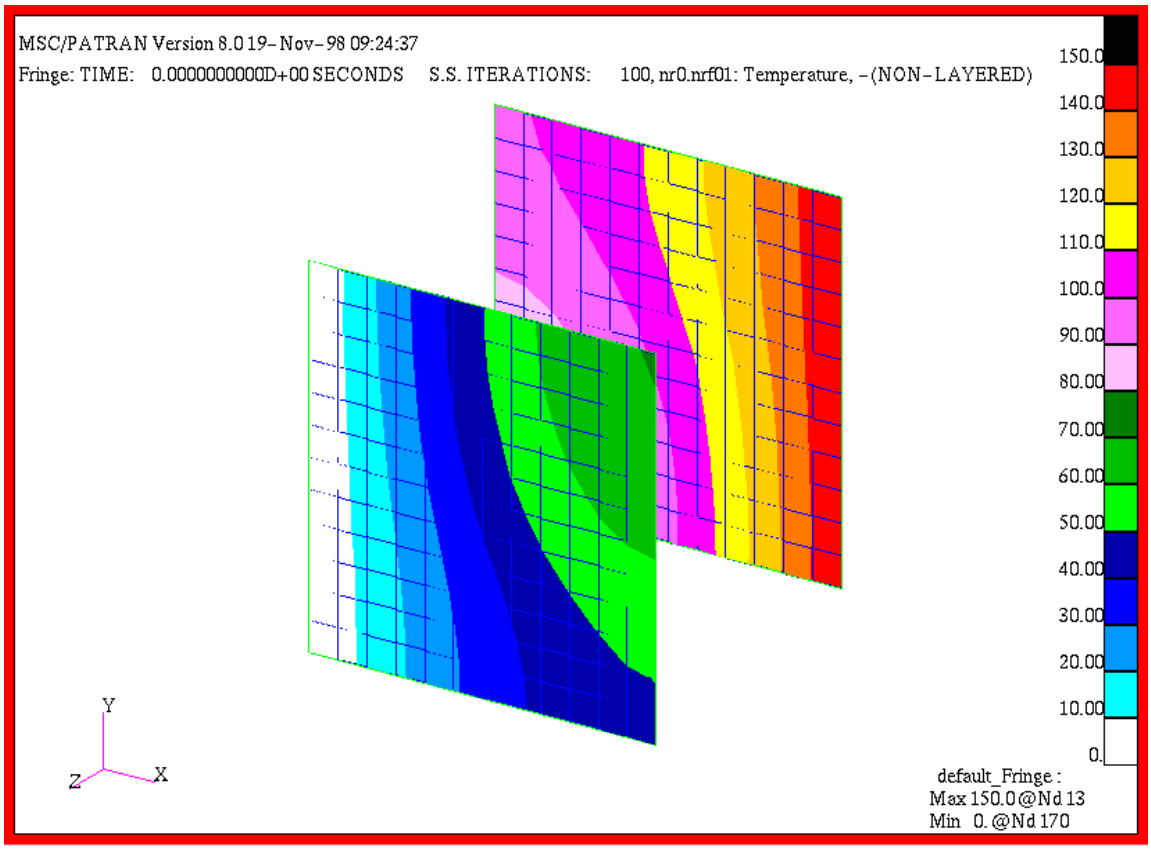
WORKSHOP 14

Midterm: Build a Simple 2 Plate Model



Objective:

- Build a simple two plate model which meets specified requirements.
- Prepare the model for analysis and open a UNIX shell to observe the file creation and analysis process.
- Run the analysis and use UNIX and utility commands to monitor the progress of the analysis.

Model Requirements:

The purpose of this exercise is to create a model with less guidance than has been provided in previous exercises. When the model is ready for analysis you will open a UNIX shell and observe the sequence of file creation paying special attention to files which provide feedback on the progress of the analysis.

The model must meet the following requirements (see Figure on p 14-6)

- 2 - 1 x 1 x 0.001 meter plates with an MID of 353 (steel).
- Plate surface normals shall face each other.
- Each plate shall have a quadrant overlapping the other such that each plate has a corner point coincident with the center point of the other plate in Plan view.
- The plates shall have a 0.05m gap between them.
- Each plate shall have a mesh of 12x12 quad elements (global edge length 0.083).
- Only one vertical edge of each plate shall have fixed boundary temperatures. The left most edge (x=0) shall be 0 degrees Celsius; the right most edge (x=1.5) shall be 150 degrees Celsius.
- The two plates shall be thermally coupled by a single radiation boundary condition. Each plate has an emissivity of 0.1. Use a TID of 100 and an Enclosure ID of 1.
- All boundary conditions and element properties shall be applied to geometry.

Exercise Overview:

- Open a new database named **exercise_14.db.**
- Create a model which meets the specified requirements.
- Review your model against the checklist of questions.
- Open a UNIX shell before submitting the model for analysis.
- Submit the model for analysis and use the commands described to monitor its progress.
- Debug, if necessary and resubmit after deleting all the files in the jobnamed subdirectory.
- Read in results file and plot results.
- **Quit** MSC.Patran.

Exercise Procedure:

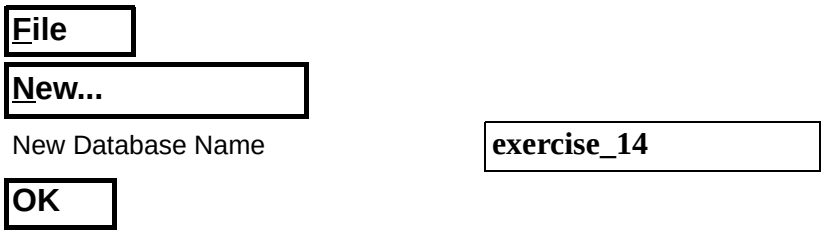
Open a new database

1. Open a new database named **exercise_14.db**.

Within your window environment change directories to a convenient working directory. Run MSC.Patran by typing **p3** in your xterm window.

Next, select **File** from the *Menu Bar* and select **New…** from the drop-down menu. Assign the name exercise_14.db to the new database by clicking in the *New Database Name* box and entering **exercise_14**.

Select **OK** to create the new database.



MSC.Patran will open a Viewport and change various *Main Form* selections from a ghosted appearance to a bold format. When the New Model Preferences form appears on your screen, set the *Tolerance* to **Default,** and the *Analysis Code* to **MSC/THERMAL**. Select **OK** to close the New Model Preferences form.

OK

2. Create a model which meets the specified requirements.

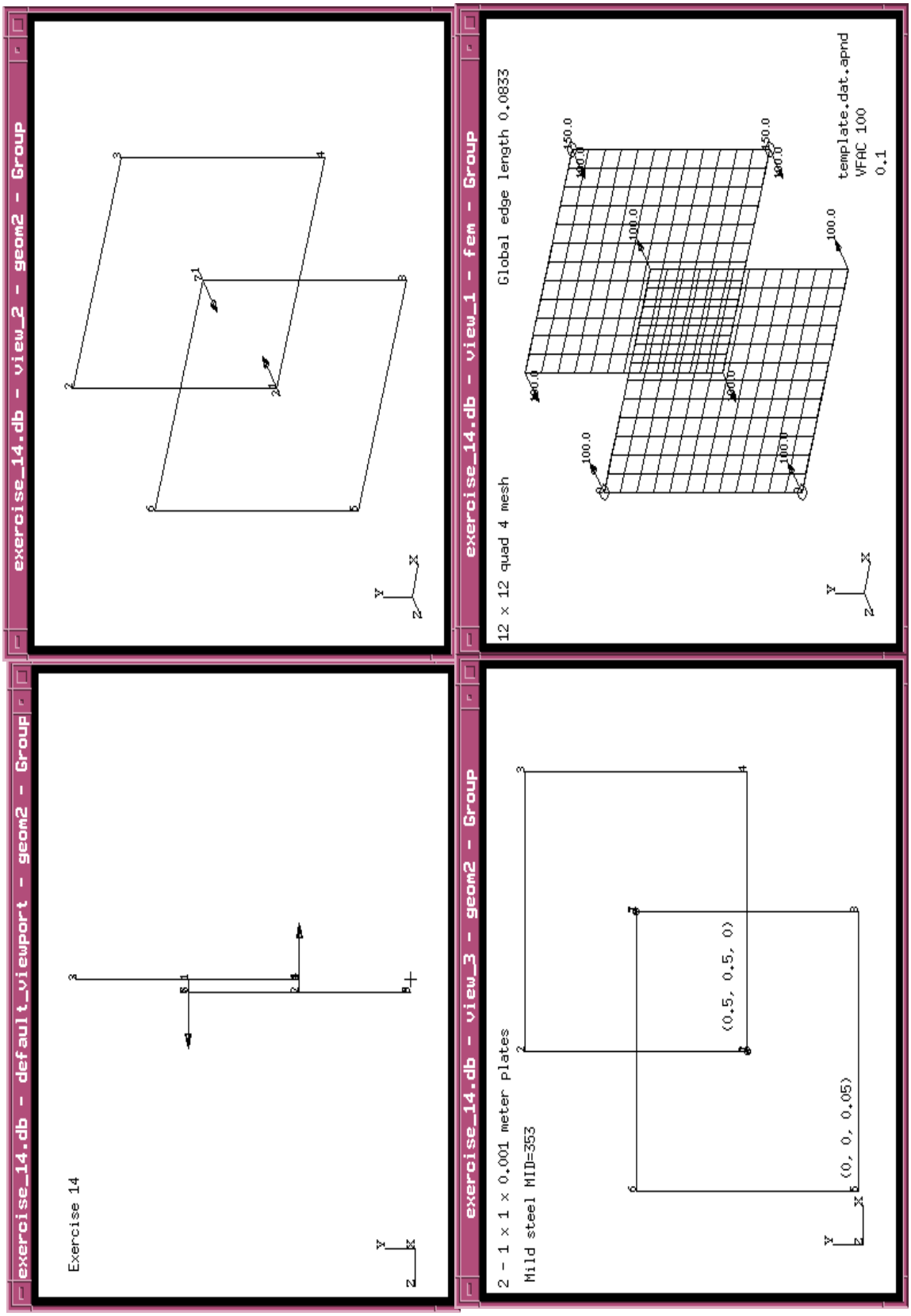
Create a model

Based on what you've practiced, create the model according to the Model Requirements

When completed model, should fit description shown on the next page.

Note:

The radiation boundary condition Input Data form has several list boxes for data entry. Despite the fact that all of the list boxes on the Input Data form appear to be required entries, you need only provide an *Enclosure Id* and a *VFAC Template ID* for this exercise. The other fields will be explored further in Exercise 21.


exercise_14.db - view_2 - geom2 - Group
exercise_14.db - view_1 - fem - Group
Global edge length 0.0833
12 x 12 quad 4 mesh
template.dat.apnd
VFAC 100
0.1
exercise_14.db - default_viewport - geom2 - Group
Exercise 14
exercise_14.db - view_3 - geom2 - Group
2 - 1 x 1 x 0.001 meter plates
Mild steel MID=353
(0.5, 0.5, 0)
(0, 0, 0.05)

3. Review your model against the checklist of questions.

Review your model

Did you use the various view icons to verify the placement of geometry?

Did you check surface normals using **Geometry/Show/Surface/Normal**?

Is the element type **2D/Shell** with Material **353** and thickness **0.001**?

Was your *Target Element Type:* **2D** for the radiation boundary condition?

Did you plot LBC markers to verify 2 fixed temperatures and radiation?

Does the radiation LBC use *VFAC Template ID*=**100** and *Enclosure ID*=**1**?

Have you created **template .dat.apnd** with

```
*===============
VFAC 100
0.1
*===============
```

and no blank lines?

In the Analysis form have you set: *Requested Calculation* and *Output Temperature* scales to degrees Celsius?

Have you requested **Perform Viewfactor** in Solution Type form?

4. Open a UNIX shell before submitting the model for analysis.

Open a UNIX shell

Once the model is verified, the **template.dat.apnd** file is built, and the Analysis form is complete, iconify the MSC.Patran viewport and open a new UNIX shell to get a UNIX prompt. Use the UNIX **ls** and **cd** commands to get to the directory in which your database resides. When you are located in the directory type at the prompt:

$ cd exercise_14 but do not hit <CR> or enter

5. Submit the model for analysis and use the commands described to monitor its progress.

Submit the model

Return to the open Analysis form and check **Apply.** After the Command Line History Window stops scrolling and the *Heartbeat* is again green , change focus to the UNIX window and use the **cd**

exercise_14 command with a carriage return. Repeated execution of **ls** within the *Job Name* subdirectory will show you the progress of your analysis: Once the file **vf.msg.01** appears, type:

$ tail -f vf.msg.01 <CR>

This will provide a continuous status of the viewfactor run.

When viewfactor is complete it will end the status with a message, Successful Execution Completed.

Use the **<ctrl>c** *key* combination to terminate the tail function.

Repeatedly input a sequence of **ls** commands until a **stat.bin** file appears in the directory list. Once you the see the **stat.bin** file type:

$ qstat c

to monitor the progress of the network analysis. This command will self terminate after 20 repetitions or upon job completion. Monitor the data from the **qstat** command to determine the numerical status of the analysis.

Check for the existence of an **nr0.nrf.01** results file. If it exists the numerical analysis is complete and successful.

Debug

6. Debug, if necessary, and resubmit after deleting all the files in the jobnamed subdirectory.

If Step 5 does not yield a results file then determine what went wrong.

Is there a patqb.log file?

If so, then is there a patq.msg file? If there is no patqb.log file then look in the MSC.Patran Command Line History Window or in the MSC.Patran interface for any error messages.

If there is a patqb.log file and no patq.msg file then look for error messages in patqb.log.

If there is a patq.msg file then look for error messages in it.

If there are no error messages in the patq.msg file but this analysis requests that a viewfactor run be made then is there a vf.msg file?

If there is a vf.msg file then look for error messages in it.

For this analysis answering the above questions should provide a clue to the problem.

Once the error is found and resolved Repeat Steps 4 and 5. Remember that now many of the files will have an extension index which has been incremented by 1, e.g., **vf.msg.01** to **vf.msg.02**. If it is convenient you may delete all the files from the **exercise_14** Job Named subdirectory prior to resubmitting the analysis.

7. Read in results file and plot results.

Read and plot results

From within MSC.Patran the only indication that the analysis has successfully finished is the existence of an nrX.nrf.01 results file in a subdirectory one level below your working directory.

Recall that p3 was initiated from a working directory which contained the microcircuit.db database file. The analysis, initiated from within MSC.Patran, created a new subdirectory with the same name as the *Job Name*; it should be named exercise_14/. By using **Read Result** in the Analysis form and **Select Results File...** you can filter down to the *Job Name* subdirectory and check for the existence of the results file.

◆ Analysis

Read Results/Result Entiies

Select Results File...

Directories — **<path>/exercise_14**

Filter

Available Files — **nr0.nrf.01**

OK

Select Rslt Template File...

Files — **pthermal_1_nodal.res_tmpl**

OK

Apply

To plot the results to posted FEM use the **Results** *Application radio button*.

◆ Results

Create/Quick Plot

Select Result Cases — **TIME: 0.0000000000D+00 S...**

Select Fringe Result — **Temperature,**

Select the *Fringe Attributes* icon.

Display:	**Element Edges**
Label Style...	
Label Format:	**Fixed**
Significant figures	**4 <use slider bar>**
OK	
Apply	

The model should now appear as shown on the front panel of this exercise.

8. **Quit** MSC.Patran.

Quit MSC.Patran

To stop MSC.Patran select **File** on the *Menu Bar* and select **Quit** from the drop-down menu.