Setting Model Translation Options

Specify *Model Translation options* on the *Solution Data* form to export the thermal model in SINDA or TRASYS format, or to specify an *Include File*.

[Locate the icon.](#)

Create TRASYS Input File

The radiation model will be translated into a TRASYS format input deck at run time. The TRASYS model will be output to file FMODLF at run time.

Radiating shell elements are translated as TYPE=POLY surfaces. The default is ACTIVE=TOP; if reverse side material properties are defined or Reverse Sides entities exist, ACTIVE=BOTH is used. You can use parabolic elements in I-DEAS to define curved surfaces in the TRASYS model. These are translated as the appropriate surface type: DISK, CONE, CYL, SPHERO, or PARAB.

Create SINDA Input File

The finite difference thermal model constructed by TMG will be exported as a SINDA model at run time. The SINDA model is created by translating the conductances, capacitances, heat loads, and temperatures of the thermal model (file MODLCF). The SINDA deck is output to file FMODLF.

The SINDA model contains:

> TITLE DATA
>
> NODE DATA
>
> CONDUCTOR DATA
>
> SOURCE DATA
>
> VARIABLES1 DATA

A utility called *sinmer* is provided with TMG to merge the FMODLF output with a user-supplied "template" file to produce a complete SINDA model. The *sin85mer* utility does the same, except that it also translates the model to SINDA 85 format.

If you have used I-DEAS TMG to build a SINDA model, you can also use it for post-processing temperature results. To do this, you must set up your SINDA model so that it will output temperatures in TMG format by including the following in the SUBROUTINE DATA block:

```
          SUBROUTINE TMGOUT
             INTEGER*4 NDIM,NTH,NX,NNA,NND,NTC
             COMMON/XSPACE/NDIM,NTH,NX(1)
             COMMON/TEMP/T(1)
             COMMON/DIMENS/NNA,NND,NTC
             COMMON/FIXCON/TIMEN
             SAVE
             DATA KSTART/0/
             IF(KSTART.EQ.0)THEN
                OPEN(31,FILE='TEMPF')
                KSTART=1
             END IF
             WRITE(31,'('' -99999'',F15.7)')TIMEN
             DO 50 I=1,NTC
              IF(NX(I).LT.10000)WRITE(31,'(I7,F15.7)')NX(I),T(I)
    50       CONTINUE
             RETURN
             END
```

For SINDA 85 models, use the following:

```
    F         SUBROUTINE TMGOUT
    F         INTEGER I,NNOD,NDINT
              CALL COMMON
    F         WRITE(NUSER1,100)TIMEN
      100     FORMAT(' -99999',F15.7)
    F         DO 50 I=1,NNOD
    F            IF (NDINT(I).LT.10000) WRITE(NUSER1,'(I7,F15.7)')NDINT(I),T(I)
       50     CONTINUE
              RETURN
              END
```

In either case, this will produce a TMG results file TEMPF. You should copy this file to the directory where you were running I-DEAS, then type *tmg* to activate the TMG Executive. Select *RR* to run the results post-processor, and request element and nodal temperature recovery. Then bring up the I-DEAS model, and use TMG's *Get Results* to import the temperatures. You can then post-process these as you would with normal TMG results.

Some of TMG's thermal modeling features can not be translated to a SINDA model:

- Fluid models

- Phase change

- Thermostats

- Convective correlations

- Temperature recovery for element elimination

Create a NEVADA input file

The TMG finite element model is exported to a NEVADA deck. Each element of the model is translated into a NEVADA surface unless you created NEVADA primitives and a NEVADA scratch file with the nevada.prg program file. In this case, the elements forming a NEVADA primitive are conglomerated and are translated as one NEVADA surface. (See *NEVADATM Interface* below).

Create an ESATAN input file

The finite difference thermal model constructed by TMG will be exported as an ESATAN model at run time. Refer to the TMG reference Manual for the format description.

NEVADATM Interface

The NEVADA Interface is a tool for constructing, visualizing and manipulating NEVADA radiation models within I-DEAS as well as importing and exporting NEVADA models to and from I-DEAS. The interface is interactive and menu driven.

The NEVADA Interface can create, modify, move, delete and copy NEVADA surfaces and define local surface coordinate systems. It can also export TMG thermal models to a NEVADA data deck format or import NEVADA model into I-DEAS.

The NEVADA Interface is a program file. It executes I-DEAS commands within an I-DEAS session. While a program file is running, do not use the icon panel.

Importing a NEVADA Model

Although not all NEVADA surface types are supported, the translator can read all the data structures of a NEVADA model. Only the supported surface types will be imported within I-DEAS.

1. Change to the Meshing task.

2. Create an empty FE model in I-DEAS.

3. From the File menu at the top of the icon panel, pick Program Files, then Run...

4. Enter $SDRC_TMG/if/nevada.prg

5. From the screen menu, pick Read NEVADA deck

6. Enter the file name.

7. Save the model.

NEVADA surfaces will be converted to shell elements for display purposes, however the NEVADA surface definition is preserved. The elements are tagged so that the NEVADA Interface can recognize them as belonging to the NEVADA surface.

Working with NEVADA Surfaces in I-DEAS

To enhance the modeling flexibility and simplicity, the NEVADA Interface does not create I-DEAS surfaces to represent NEVADA surfaces. Instead, the interface generates a mesh having the same overall dimensions and position as the NEVADA surface and the elements are displayed. If the model is subsequently exported to NEVADA, this mesh is converted to the NEVADA surface definitions along with their coordinate systems. On the other hand, if the model is subsequently solved in TMG, the elements themselves are used.

When NEVADA surfaces are created, modified or imported, the NEVADA Interface creates thin shell elements to represent the surface. Whenever possible, quadrilateral elements are created. Triangular elements are used if required to complete the geometry as in the case of a sphere. By default, the software will generate only enough elements to ensure an aspect ratio close to one. However, the user may increase the mesh density if desired.

If you wish to create a surface coordinate system for a NEVADA surface, you must have appropriate selectable points in your model before you can do so.

NEVADA Surface Creation

While creating a surface, the interface will prompt the user for the specific surface parameters in the prompt region and display messages to the list region. For a description of the surface parameters used, see the NEVADA users manual.

To create a NEVADA surface:

1. Start the NEVADA Interface program file (steps 1 through 4 under Importing a NEVADA Model, above).

2. Select Create a surface from the Graphics region menu.

3. Select the surface type you want to create.

4. Follow the prompts to specify surface name, label, and parameters.

5. Pick Generate surface.

6. If you wish to define a coordinate system for the surface, select yes, then select the definition method, then pick the points. You can select the points directly or use the standard I-DEAS point picking options available under MB3.

7. The Material properties form appears. Create or select a material property for the shell mesh

8. The Physical Properties menu appears. Create or select a physical property for the shell mesh.

9. Specify Ordinary or Mask surface type to identify whether the surface will have the NEVADA Mask property. This property is ignored by TMG.

10. Once you have created all your NEVADA surfaces, select the option: *Generate a NEVADA Scratch file*. With this file, TMG recognizes the elements of each NEVADA surface and conglomerates them to form the NEVADA surfaces when exporting the model. Without this scratch file, each element is exported as a NEVADA surface.

NEVADA Surface Modification

The user can translate and/or rotate any surface. The NEVADA Interface uses the same commands to move and modify NEVADA surfaces that I-DEAS uses to move and modify elements, including material and physical properties and color.

The same surface parameters used in NEVADA surface creation are available for surface modification.

Selection and Display Options

To select a surface, select from a list of all surfaces or a filtered list. You may filter on surface name and/or NEVADA label. You can also pick (in the Graphics region) any element belonging to the surface. The selected surface will be highlighted.

The NEVADA label can be displayed for each entity. To facilitate visualization, display options are available from the NEVADA Interface menu similar to those available in I-DEAS.

Notes on the NEVADA Interface

Supported NEVADA Surface Types:

- Quadrilateral

- Triangle

- Ellipse

- Sphere

- Cylinder

- Cone

- Paraboloid

- Box

- Offset Paraboloid

Exporting Rules for Thermal Material Properties

When exporting these properties: emissivity, absorptivity, solar or infrared transmissivity and solar or infrared specular reflectivity, the following rules apply:

- Elements having a NULL emissivity are not translated.

- Elements having a property value between 0 and 1 are translated as is.

- Elements having property values defined as varying are translated with a value of zero.

If a surface was created with Master Modeler and meshed with the Meshing task, then exported to NEVADA, each element will be exported as a separate NEVADA surface.