ESARAD v5.4

Bruno CASTELLI

- ESARAD v5.4 released in June 2003
- Previous version released: v5.1
- Version 5.2 was used for developments
- New numbering convention:
  - odd second digit: for developments (5.3)
  - even second digit for commercial releases (5.4)
ESARAD v5.4

- List of new features
  - New Combine Shell
  - Recursive Attribute Editing
  - Spacecraft Orientation
  - Simplified Kernel Language
  - ACG
  - New Custom Menu
  - NASTRAN Converter
  - New HDF Data Format

- Short demo if time permitting

 ESARAD v5.4

- Objectives

 ESARAD v5.4

- Objectives

 Geometry - New features

- New Combine Shell Dialog

- Recursive Attribute Editing

- ACG

- Geometry Summary
New Combine Shell Dialog

- Select shells from the left hand side list.
- Put them in the right hand side list.
- Enter a Target name.
- Click on “Combine Shells”.

Recursive Attribute Editing

- Geometry New Features -
Automatic Conductance Generator

- Automate Calculations of Linear Conductances
- Recognise interface between two shells
- Output GL value to ESATAN file
- Works on uncut shell primitives
- Contact on common straight edge
- All intra GLs computed
- Inter GLs between Quads and Triangles only

1st Option: Automatic

After having assigned the model, still in the Geometry workspace:

ESARAD will automatically detect the conductive interfaces, display them in the visualisation window and pop the dialog to process the interface type
1st Option: Automatic

- The Connection type can then be changed to one of the following:
  - FUSE: two shells form a single continuous surface
  - JOIN: two surfaces are linked by a contact conductance
  - NOT_PROCESSED: default
  - NOT_REQUIRED

- The Connection type can then be changed by either:
  - Clicking in the visualisation window on a conductive interface
  - Selecting the interface from the list in the dialog
2nd Option: Manual

After having assigned the model, still in the Geometry workspace:

To visualise the Conductive Interfaces and their parameter:
ACG

Outputting GLs to ESATAN

1. Calculate Linear Conductance in the Thermal Model Menu:

2. Click Output GL in the Analysis Case:

- Geometry New Features -

ESARAD v5.4

Visualisation - New features

Background defaults to White

- Visualisation New Features -
Kernel - New features

- New Spacecraft orientation

- Simplified Kernel Language

New Spacecraft orientation

- Primary and Secondary vectors make it easier to define the spacecraft orientation within the orbit

- Select vectors from the GUI

- Old LOCS Orientation method still working

- Kernel Summary -
All the previous calculate functions have been replaced with one new calculate method.

```
CALCULATE_ORBIT_POSITION
CALCULATE_ORBIT_POSITION_WITH_SPIN
CALCULATE_PLANET_ABSORBED_FLUX_MATRIX
CALCULATE_PLANET_ABSORBED_FLUXRAYTRACING
CALCULATE_PLANET_DIRECT_FLUX
CALCULATE_SOLAR_ABSORBED_FLUX_MATRIX
CALCULATE_SOLAR_ABSORBED_FLUXRAYTRACING
CALCULATE_SOLAR_DIRECT_FLUX
CALCULATE_VIEW_FACTORS
CALCULATE_RADIATIVE_EXCHANGE_FACROTORS_MATRIX
CALCULATE_RADIATIVE_EXCHANGE_FACROTORSRAYTRACING
```

Example of a new CALCULATE method for a moving geometry:

```
FOR (orbit_index = 1;
    orbit_index <= rcase.NUM_ORBIT_POSITIONS;
    orbit_index = orbit_index + 1)
    CALCULATE ( radiative_case = rcase,
                 calc_types = "REF, SDF, SAF",
                 pos_index = orbit_index,
                 eclipse_check = TRUE);
END FOR
```
Library - New features

- New Custom Menu

- NASTAN Converter

- Library Summary -

New Custom Menu

- Allows external process to be called from within ESARAD
- Can integrate user’s application to work with ESARAD
- Can launch program or access system functions without needing to leave ESARAD
- Call NASTRAN converter
- Call STEP-TAS converter
- In the Library workspace

- Library New Features -
- Library New Features -

- Library New Features -

NASTRAN Converter

- Library New Features -

NASTRAN Converter

- Library New Features -

• Converts MSc/NASTRAN input files into ESARAD
• Only supports thin shells and elements (TRIA and QUAD)
• Maps GRID points ⇒ ESARAD Points Variables
• Maps FE elements ⇒ ESARAD shells
• Does not translate Material data yet
• Can be used with Combine Shells & Recursive Attribute

Examples

Nacelle Air-Inlet  Turbine Blade

- Library New Features -
Data Format - New features

- New Data Store HDF (Hierarchical Data Format)
- Neutral Binary
- Platform Independent
  - same model can be opened from any platform
  - can transfer a complete model (with all data) to another site
- Only compatible with ESARAD v5.4 onwards

Conclusion

Chris KIRTY will present future developments after the break.
ESARAD Demo

Bruno CASTELLI

ESARAD v5.4 Demo

- Import a model from NASTRAN
- Assign the model
- Define properties
- Run ACG
- Export the model to ESATAN

- Demo Objectives -
Import from NASTRAN

- Demo -

NASTRAN .ns file

ESARAD .erg file

Import .erg file

Create et open the model in ESARAD

- Demo -
Assign the model

1. Define Optical Properties

- Demo -

2. Define bulks

3. Assign properties

Run ACG

- Demo -
Export model to ESATAN

1. Run a kernel

2. Calculate Linear Conductances

3. Open an Analysis Case

4. Output to ESATAN

5. Inspect Output

- Demo -
Inspect ESATAN Input File

- Demo -

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