

Chemical Engineering 512

Nuclear Reactor Transient Modeling

Lecture 5

RELAP5-3D Output Description

Trips



Spiritual Thought

2 Cortinthians 9:7

7 Every man according as he purposeth in his heart, so let him give; not grudgingly, or of necessity: for God loveth a cheerful giver.



Objectives

- Understand how to read an output file
- Learn about how to use trips
- Practice adding trips



Output Files

- Input Processing Information
- Echo of input
 - This is where interpretation errors are shown
- Major Edits
- Minor Edits
- Errors listed
 - 0***** - Warning
 - 0\$\$\$\$\$\$\$\$ - Note



Trips (A5-1)

- Variable Trips (401-599)
 - Compares two values
 - If pressure in volume 301 exceeds pressure in volume 401
 - If time of problem is greater than 100 seconds
- Logical Trips (601-799)
 - Tests a relationship between two other trips
 - If trip 501 and 502 are on
- Trip Stop Advancement (600)
 - One or two trips that will stop the problem



Example

```
63 *****
64 *
65 *                               Trips
66 *
67 *****
68 *
69 *   VarCode  Parameter  Rel  VarCode  Parameter  AddConst  Latch  TimeOf
70 401      p      301010000  lt   null      0          1800      n      -1.0
71 *
72 *   TripNum  Operator  TripNum  Latch
73 601      501      or      502      n
74 *
75 *   TripNum      2ndTripNum
76 600      401      601
77 *
```



Sample Problem 1

- Develop a model for a 60 m long horizontal pipe with a flow area of 0.196 m^2 . Divide the pipe into 20 cells of equal length.
- Initialize the fluid in the pipe at 5.0 MPa and 500 K, which are also the conditions of the source volume.
- The sink volume has the same temperature, but its pressure is 4.9 MPa.
- Start the flow at zero, and increase it linearly to 400 kg/s over 200 s. Draw a nodalization diagram for this problem
- Complete an input deck
- Run the deck to ensure it works properly
 - How do we do this?



Trip Addition

- Add trips so that the flow stops once 180 seconds of computational time has passed

OR

- Once the flow reaches 300 kg/s



Output File Analysis

- Run the example file after adding the trips
- Find the last “MAJOR EDIT”
- Which trip actually stopped the flow?



Assignment

- Watch DVD sections 18-24 before next class
- Homework 3 due next Thursday (9/25)

