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# TriglavW - Windows Interface for TRIGLAV
# User's Guide

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(Beta Version)

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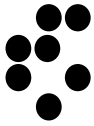
**Odsek za reaktorsko fiziko F-8**



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# 1. Introduction

TRIGLAV program package is developed for reactor calculations of mixed cores in TRIGA Mark II research reactor. It can be applied for fuel element burnup calculations, for power and flux distributions calculations and for critically predictions. For more information see TRIGLAV manual (document number IJS-DP-7862 - see References for more details).

TriglavW is Windows interface for TRIGLAV program. TriglavW was developed to help users in preparation of TRIGLAV input and rapid modification - shuffling elements in core configuration. TriglavW is very useful for viewing results from TRIGLAV program. TriglavW can produce 2D color schemes of different TRIGLAV output parameters (e.g. fuel burnup distribution, fission power distribution, ...) and different 3D plots (e.g. neutron flux distributions, ...).

In this user manual the files of the program package distribution are described.
Program installation instructions are given for a PC under MS Windows operating system.

## 1.1. Important Notes to the User

This manual should not be treated as standalone document. This manual must be always read together with TRIGLAV code manual (IJS-DP-7862 - see References for more details)!

Fuel element description files and reactor core input files supplied with this package are suitable for demonstration purposes only! The user must construct new element description (ELEM.INP) and reactor core (TRIGLAV.INP) files before any serous burnup, power and flux distributions, or critically calculations are performed!

# 2. Installation of the program

## 2.1. Installation of the TRIGLAV and TriglavW program

The TRIGLAV/TriglavW program can be installed and executed on a PC under Windows-9x/2000/XP operating system.

To install the TRIGLAV/TriglavW program package:
- Copy the package distribution file (TRIGDIS.EXE) to the disk c:\.
- Run TRIGDIS.EXE.
- Click on Unzip

A self-extracting exe file is decompressed to default location: c:\.
It is recommended that, program is extracted to root directory (e.g.: c:\, d:\,. e:\...) or to subdirectory name "without_blanks" (c:\triga\, ...) and not in directory like "c:\document and settings\user\dir1 dir2\...".

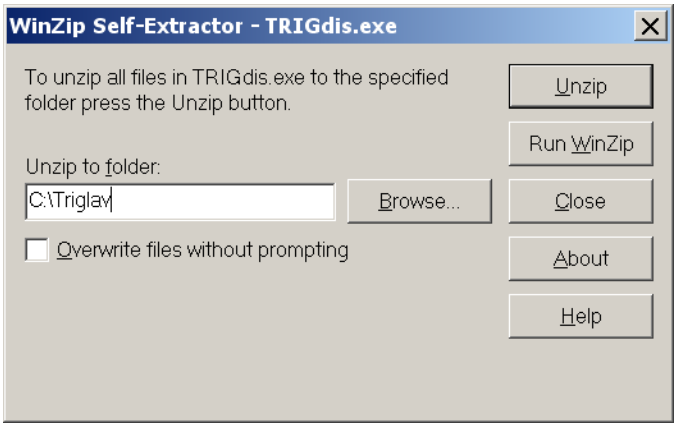



**Figure 1 Extracting Triglav distribution files to disk**

A tree - directory TRIGLAV is created with the following subdirectories:
- Triglav - main working directory with sample test cases.
- Code - directory with executable programs for TRIGLAV program.
- Wims - directory with executable programs and libraries for WIMS program.
- Doc - directory with documentation.
- TriglavW - directory with executable programs for TriglavW program.

Optional: with windows explorer create a desktop shortcut to Triglav\Triglavw\TriglavW.exe - windows interface for Triglav program.

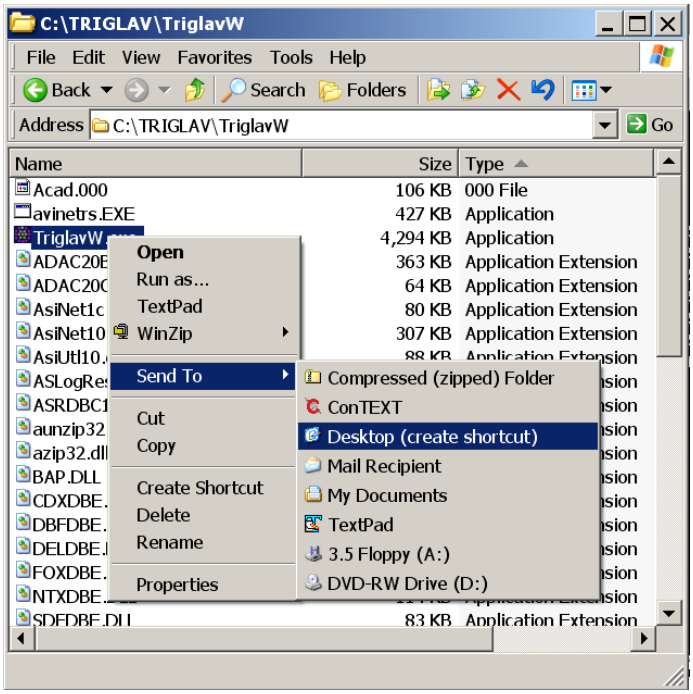



**Figure 2 Create shortcut to Triglav\Triglavw\TriglavW.**

## 2.2. Testing TRIGLAV program

To run all test cases start the command prompt and go to main \Triglav directory (c:, cd \triglav). Run prepared batch file RUNALLTE.BAT.

The RUNALLTE test procedure automatically runs all four test cases and compares new outputs (*.out files) with reference output files (*.tou files). Procedure stores the differences between new and reference output files in *.dif files.

Compare the differences in the output files (which are saved in *.dif files e.g. bM133.dif). If the installation is successful, there should be only differences in the time of execution.

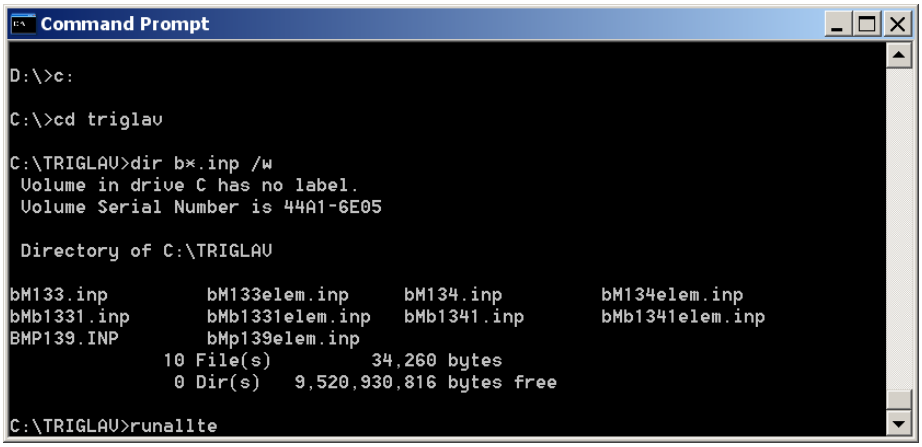



**Figure 3 Run all test cases in a command prompt (type the command "RUNALLTE").**

Typical running time is about 2 minutes for sample test case on Celeron 2 GHz.

# 3. Running TriglavW program

Start the TriglavW program with shortcut or run Triglav\triglavW\TriglavW.exe.

## 3.1. Description of the TriglavW program menu

Main menu of the TriglavW contains following menus:

- TRIGLAV - main menu for preparing input data and running the program TRIGLAV
- Setup - menu for defining colors and initial editing input files
- Help - help (not yet available)
- Quit - exit program

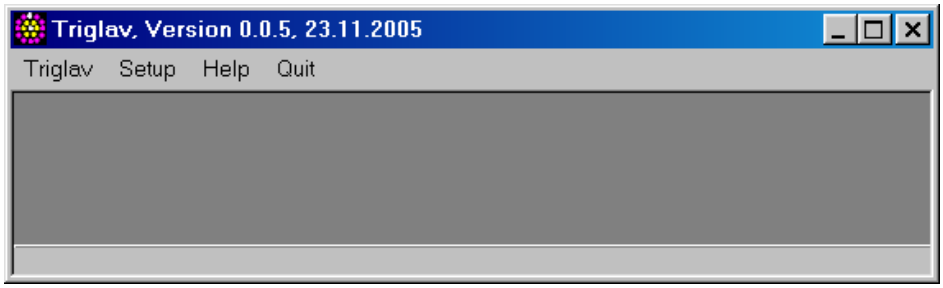



**Figure 4 Main menu in TriglavW program.**

## 3.2. Tutorial with sample problem

### 3.2.1. Prepare input parameters and running program

Click to the main Triglav menu and you will get the following main Triglav input/running window:

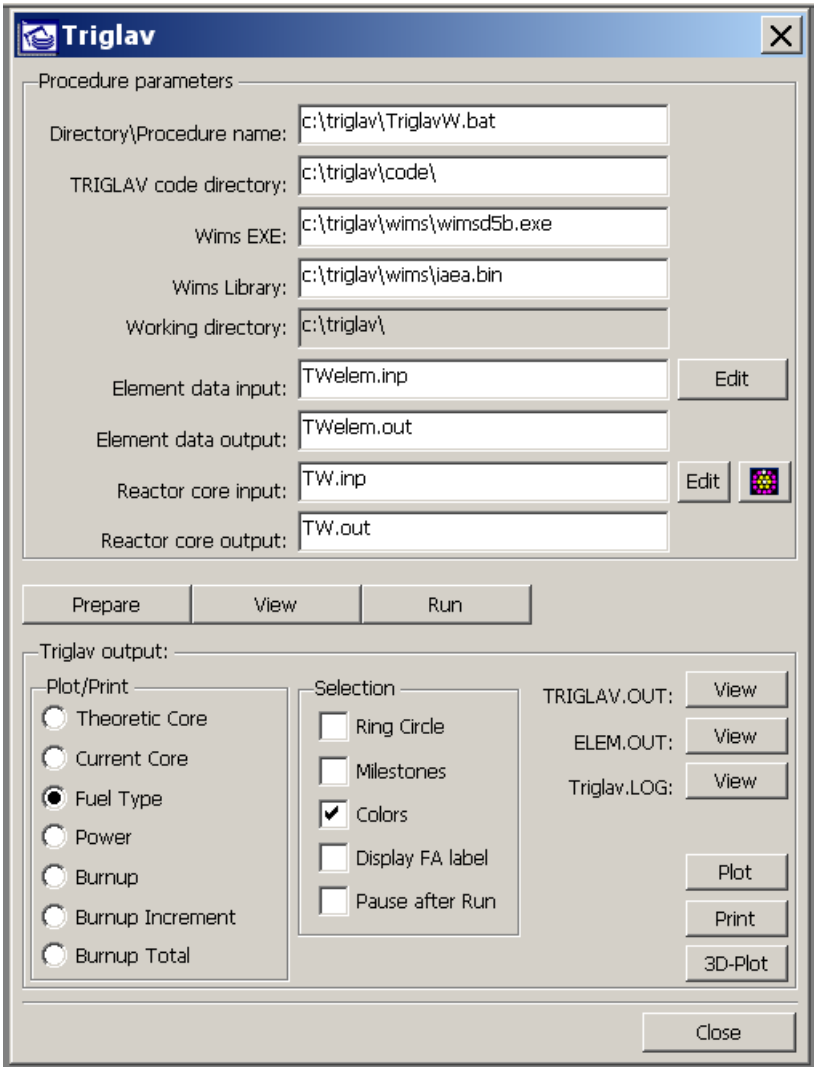



**Figure 5 TRIGLAV input/running window**

Window contains following items:

- Directory/Procedure name - defines working directory - where are a TRIGLAV input files and defines file name of a batch run (e.g. TriglavW.bat, DO NOT use the name triglav.bat - it will be overwritten).
- TRIGLAV Code Directory - directory with executable programs for TRIGLAV program.
- Wims EXE - directory with executable programs.
- Wims library - file name of the library for WIMS program.
- Element data input - file name of "ELEMENT.INP" (all elements data base, see TRIGLAV manual).
- Element data output - file name of "ELEMENT.OUT" (elements data base after computation).
- Reactor core input - file name of "TRIGLAV.INP" (current core, see TRIGLAV manual).
- Reactor core output - file name of "TRIGLAV.OUT" (main results of computation).

Review and possibly change/edit any of the parameters. After this, first click on Prepare, then on View and finally on Run button to start the TRIGLAV code. Click on Prepare button instructs the TriglavW to prepare the procedure for running TRIGLAV according to your selection of parameters. Click on View will display the prepared TRIGLAV procedure. And finally click on Run button will start the actual calculation.

### 3.2.2. Viewing results

TriglavW program offers two types of output display. First type is to display output file as a text. Second type of output is to plot the results. Box "Triglav output" contains different items to control a display of output.

Click on View buttons next to "TRIGLAV.OUT, ELEM.OUT and Triglav.LOG" to display output files on screen as text files.

Click on Plot button to plot picture (results) on screen and click on Print button to send picture (results) to printer.

Boxes "Plot/Print" and "Selection" control the output generated after pressing the Plot/Print button
Print/Plot - defines what to print/plot (power, burnup, ...)
Selection - defines how to print/plot (milestones, circle, ...)

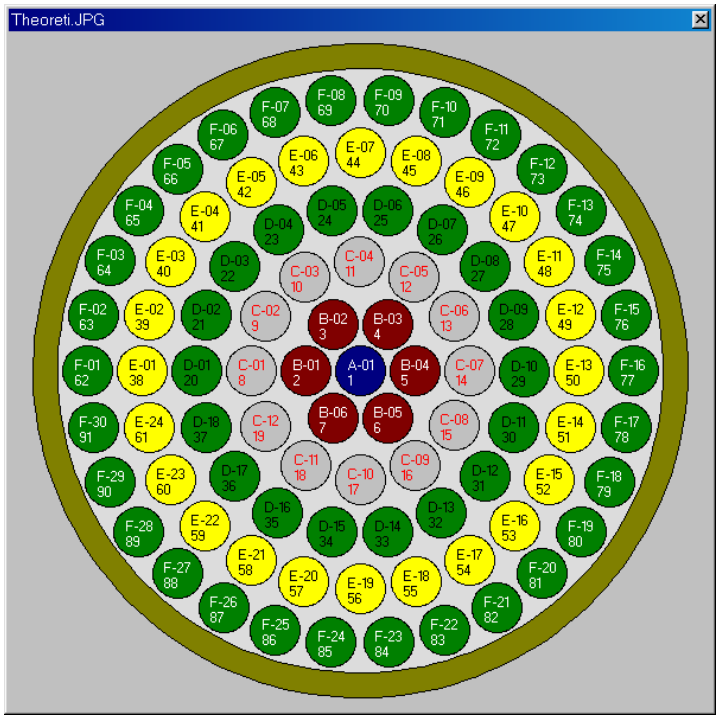



**Figure 6 Core description**

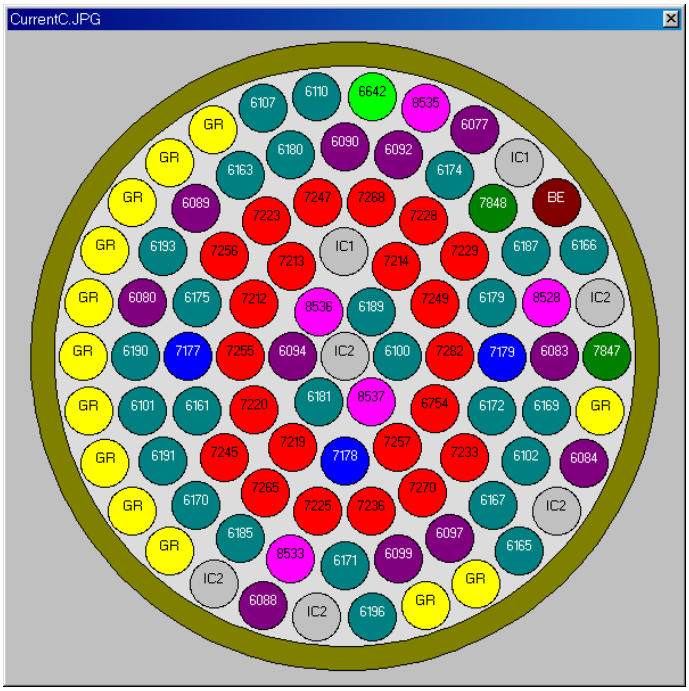



Figure 7 Current core configuration

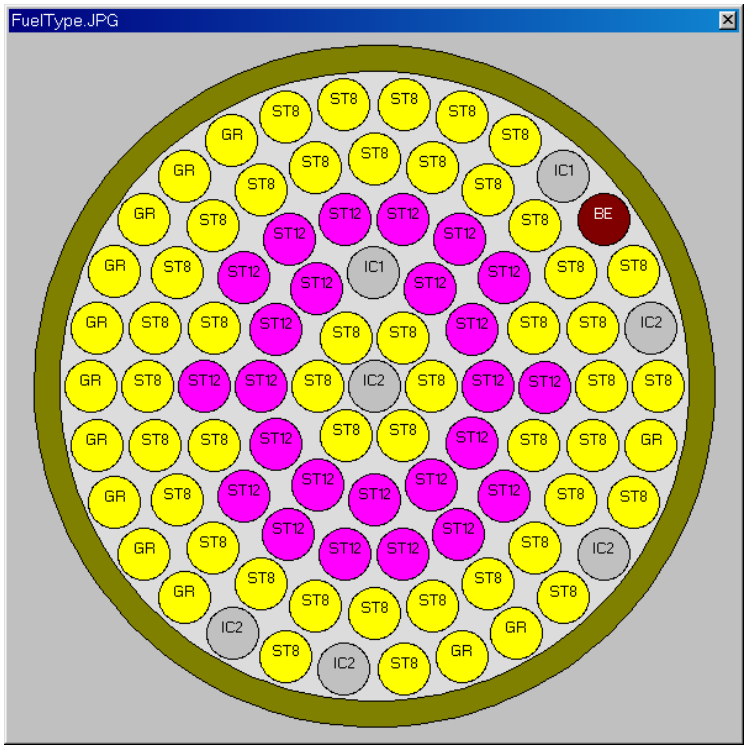
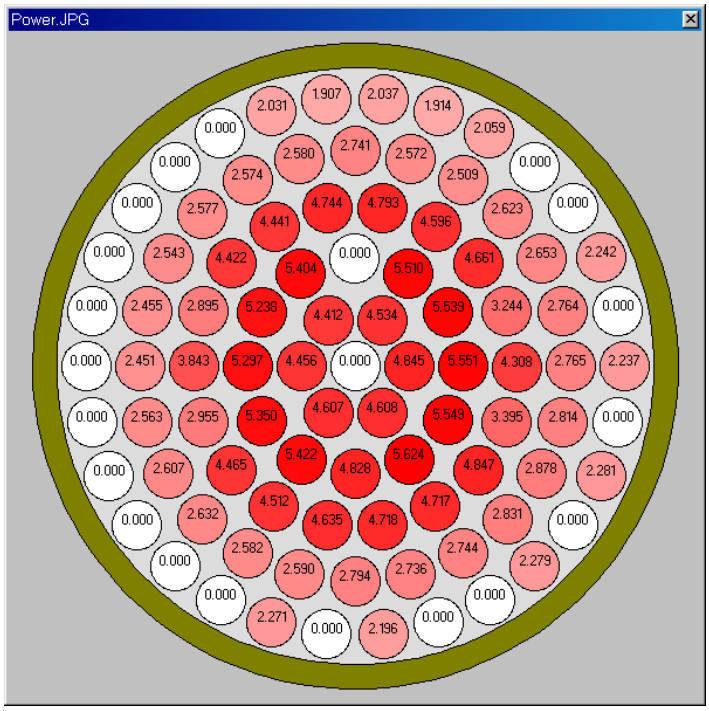



**Figure 8 Elements by fuel type the current core**


Power.JPG
2.031 1.907 2.037 1.914 2.059
0.000 0.000 0.000 

To produce a 3D perspective plot of neutron flux distribution click on 3D-Plot button. Note, that you need to activate a flag for TRIGLAV 2D diffusion code to save neutron flux data in special output file TRIGA2D.FLU. This flag is the fourth flag situated in Reactor core input file (see TRIGLAV manual for more details) and the next section of this manual.

$* FLAGS  ! print control flags:  1 ! (0-no, 1-yes) flux data printout in plot file TRIGA2D.FLU).

Sample picture:

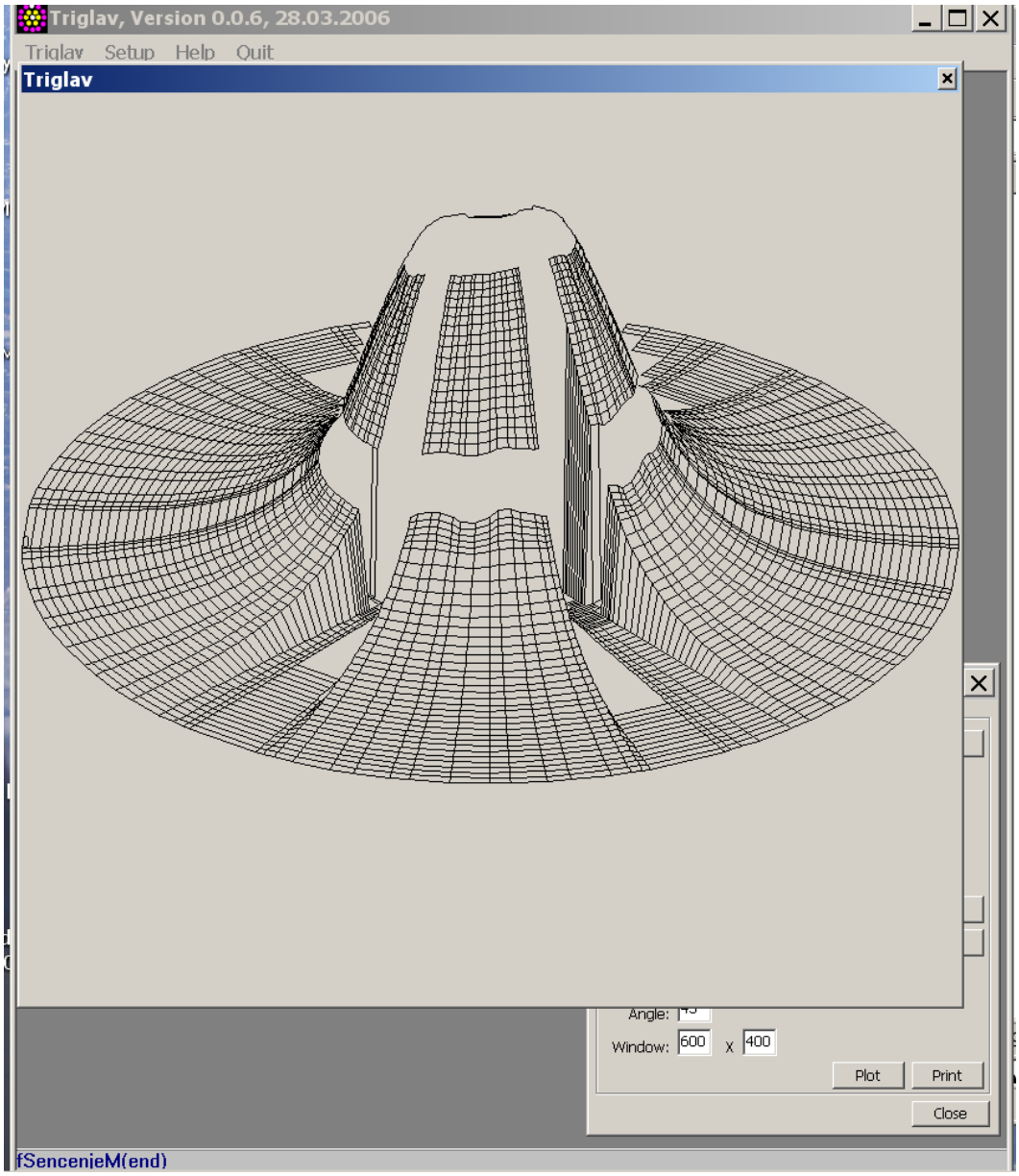



**Figure 11 Sample flux picture.**

### 3.2.3. Modifying input parameters

Modifying TRIGLAV code input parameters is activated with Edit button next to "Reactor core input" line in main Triglav window. Or by clicking on

next to Edit button. You will get Triglav/ Reactor core input window:

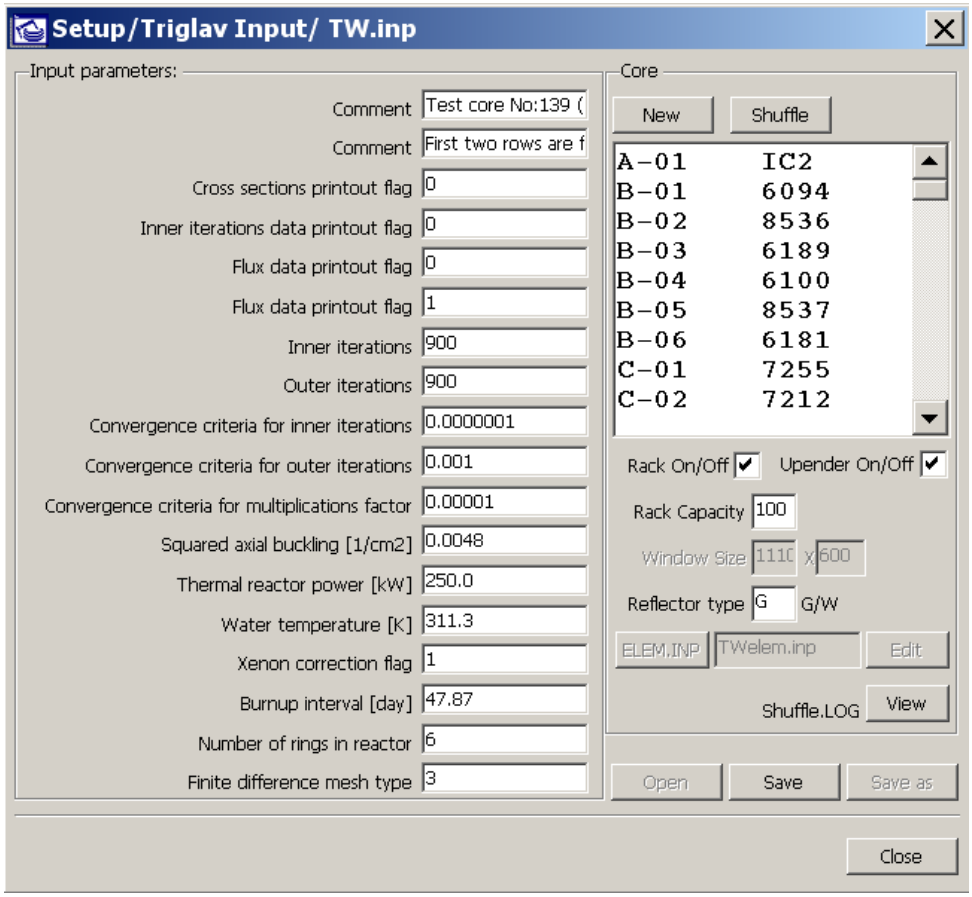



**Figure 12 Triglav input window**

Triglav input window contains two main boxes (Input parameters and Core)
In "Input parameters" box following items can be modify:

- Cross sections printout flag for TRIGLAV.OUT.
- Inner iterations data printout flag for TRIGLAV.OUT.
- Group flux distribution printout flag for TRIGLAV.OUT.
- Group flux distribution printout on file TRIGA2D.FLU (this option must be set to 1 for 3D plots).

- Inner iterations - allowed number of inner iterations for diffusion calculation.
- Outer iterations - allowed number of outer iterations for diffusion calculation.
- Convergence criterias for diffusion calculation (see TRIGLAV manual)

- Squared axial buckling equal for all four groups in [$cm^{-2}$].
- Total thermal power of the reactor in [kW].
- Temperature of water [$^oK$].
- Number of fuel rings in reactor core (6 or 7).
- Finite differences mesh used in calculation

### 3.2.4. Shuffling elements

Shuffling elements in the core is activated with TRIGLAV/ Procedure parameters/ Reactor core input/ Edit graphically icon in main Triglav window:

and then click on the Shuffle button (in the "Core" parameters box). It is important to note, that the user can move/shuffle only those elements listed in element description file (ELEM.INP). To add new elements the user has to edit the ELEM.INP file.

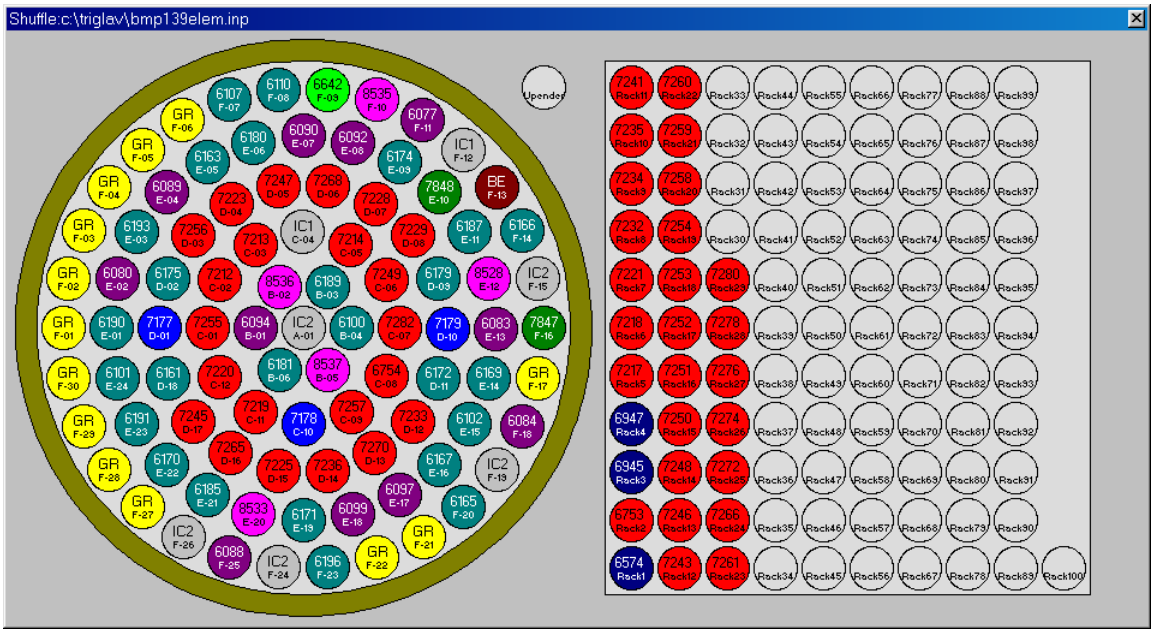



**Figure 13 Shuffle window**

To move element from core to the rack mark (click on the element):

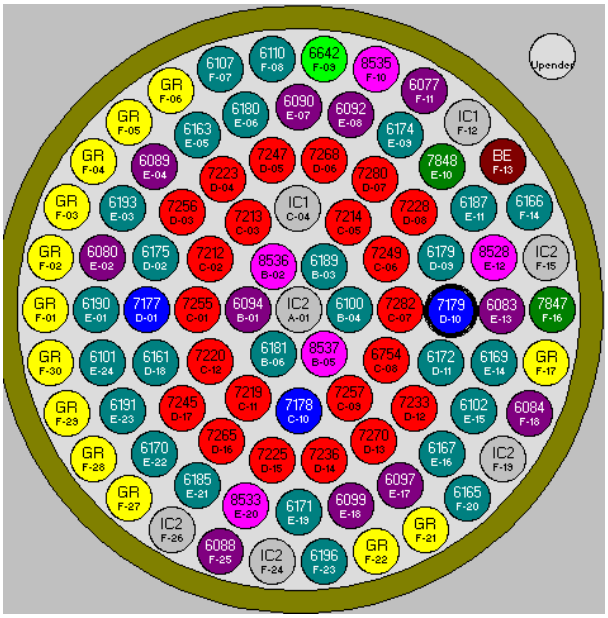



**Figure 14 Mark desired element**

and than mark (click with mouse) to the new location in the rack:

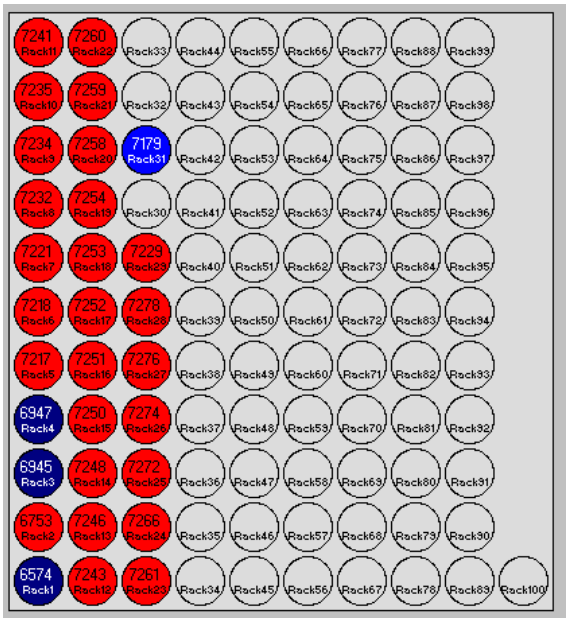



**Figure 15 Put element in rack**

All moves are recorded in shuffle log window:

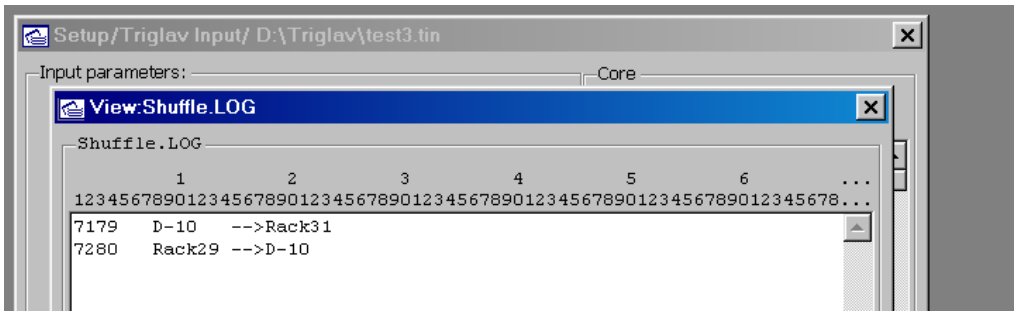



**Figure 16 Shuffle log window**

## 3.3. Starting user's new calculations

It is necessary to create new fuel element description file (called ELEM.INP) for all users to do real calculations on their fuel elements. Fuel element description files supplied with this code are suitable for demonstration purposes only. See TRIGLAV manual for more details on ELEM.INP file.

# 4. References

A. Peršič, M. Ravnik, S. Slavič and T. Žagar:TRIGLAV, A Program Package for Research Reactor Calculations, IJS-DP-7862, Version 1 (March 28, 2000)