Title:	MCNP5 Utility Programs
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Intended for:	MCNP classes & reference material

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MCNP5 Utility Programs

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Monte Carlo Codes X-3-MCC
Los Alamos National Laboratory

MCNP5 is a very general and versatile Monte Carlo particle transport code, with hundreds of options for controlling the calculations. Nevertheless, there are some common tasks that arise which cannot be performed within MCNP5; these tasks are typically handled by users on an individual basis by writing short scripts or utility programs. This report describes several utility programs that provide support for a user's workflow in carrying out MCNP5 calculations. These utility programs are described below, with comments on their availability & references to more detailed documentation.

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makxsf

DESCRIPTION

A program for manipulating the nuclear data files in ACE format used by MCNP5. makxsf can be used to copy nuclear data libraries, create subsets of the data for specific calculations, and to perform Doppler broadening and other temperature corrections to existing ACE data files.

AVAILABILITY

makxsf is included with the MCNP5 distribution package from RSICC, in the folder
`MCNP5/Source/datasrc`

DOCUMENTATION

[FB Brown, "The makxsf Code with Doppler Broadening", LA-UR-06-7002 (2006).](#)

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mcnp_pstudy

DESCRIPTION

A perl script that can be used to substitute parameters into an MCNP5 input file and then run a series of calculations. This script can be used to automate the setup & execution of parameter studies with MCNP5, to setup & run a set of parallel jobs with MCNP5 and then combine results from each into overall results with statistics, or to perform a series of calculations with varying input for determining the total uncertainty analysis.

AVAILABILITY

mcnp_pstudy is included with the MCNP5 distribution package from RSICC, in the folder `MCNP5/UTILITIES/MCNP_PSTUDY`

DOCUMENTATION

[FB Brown, JE Sweezy, RB Hayes, "Monte Carlo Parameter Studies & Uncertainty Analysis with MCNP5", LA-UR-04-0499 [paper] (2004).](#)

[FB Brown, JE Sweezy, RB Hayes, "Monte Carlo Parameter Studies & Uncertainty Analysis with MCNP5", LA-UR-04-2506 [slides from presentation] (2004).](#)

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merge_mctal

DESCRIPTION

A perl script that can be used to combine the "mctal" files created by several different MCNP5 calculations into a single "mctal" file.

AVAILABILITY

merge_mctal is included with the MCNP5 distribution package from RSICC, in the folder `MCNP5/UTILITIES/MERGE_MCTAL`

DOCUMENTATION

[FB Brown, "A Tutorial on Merging Tallies from Separate MCNP5 Runs", LA-UR-08-0249 (2008).](#)

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merge_meshtal

DESCRIPTION

A C++ program that can be used to combine the "meshtal" files created by several different MCNP5 calculations into a single "meshtal" file.

AVAILABILITY

merge_meshtal is included with the MCNP5 distribution package from RSICC, in the folder `MCNP5/UTILITIES/MERGE_MESHTAL`

DOCUMENTATION

[FB Brown, "A Tutorial on Merging Tallies from Separate MCNP5 Runs", LA-UR-08-0249 (2008).](#)

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onegxs

DESCRIPTION

A C++ program that can be used to create 1-group cross-sections with P0 or P1 scattering in ACE format. These cross-sections can then be used to perform multigroup Monte Carlo calculations of analytic benchmark problems.

AVAILABILITY

onegxs is included with the MCNP5 distribution package from RSICC, in the folder `MCNP5/UTILITIES/ONEGXS`

DOCUMENTATION

[FB Brown & N Barnett, "A Tutorial on Using MCNP for 1-Group Cross-section Calculations", LA-UR-07-4594 (2007).](#)

MCNP5 Random Number Generator

DESCRIPTION

A robust, reliable, stand-alone version of the MCNP5 random number generator is available. It may be used in user-written programs for random sampling of specialized sources, for student exercises in random sampling &/or special-purpose Monte Carlo codes, etc.

AVAILABILITY

Source coding is included with the MCNP5 distribution package from RSICC, in the folder `MCNP5/UTILITIES/MCNP_RANDOM`

DOCUMENTATION

FB Brown, "The MCNP5 Random Number Generator", LA-UR-07-7961 (2007):

Overview & Theory:

[The MCNP5 Random Number Generator](#)

[Random Number Generation with Arbitrary Strides](#)

Application & Usage

[Using the MCNP Random Number Generator](#)

Event Log Analyzer for MCNP5

DESCRIPTION

The MCNP5 event log provides detailed tracking information as a particle follows a random walk with the aid of the variance reduction techniques. Depending upon the geometry and physics involved in the problem, these event logs can often be quite large.The Event Log Analyzer (ELA) is a perl program with a Graphical User Interface (GUI) that enables an MCNP5 user to interrogate the MCNP5 event log. ELA works only with MCNP5/1.50 and later, and not with any previous versions.

AVAILABILITY

ELA is included with the MCNP5 distribution package from RSICC, in the folder

`MCNP5/UTILITIES/EVENTLOG_ANALYZER`

DOCUMENTATION

RL Martz, "ELA: Event Log Analyzer for MCNP5", LA-UR-06-7796 (2006)