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The KENO V.a Primer

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INTRODUCTION

The SCALE (**S**tandardized **C**omputer **A**nalyses for **L**icensing **E**valuation) computer software system [1] developed at Oak Ridge National Laboratory (ORNL) is widely used and accepted around the world for criticality safety analyses. The well-known KENO V.a three-dimensional (3-D) Monte Carlo criticality computer code is the primary criticality safety analysis tool in SCALE. The KENO V.a Primer [2] is designed to help a new user understand and use the SCALE/KENO V.a Monte Carlo code for nuclear criticality safety analyses. There is no assumption of familiarity with Monte Carlo codes in general or with SCALE/KENO V.a in particular. The primer is designed to teach by example, with each example illustrating two or three features of SCALE/KENO V.a that are useful in criticality analyses.

DESCRIPTION

The primer is based on SCALE 4.4a, which includes the Criticality Safety Processor for Analysis (CSPAN) input processor [3] for Windows personal computers (PCs). A second edition of the primer that uses the new KENO Visual Editor, currently under development at ORNL, is planned for publication in late 2003. Each example in this first edition of the primer uses CSPAN to provide the framework for data input. Starting with a *Quickstart* section, the primer gives an overview of the basic requirements for SCALE/KENO V.a input and

allows the user to quickly run a simple criticality problem with SCALE/KENO V.a. Each subsequent section provides a list of basic objectives at the beginning that identifies the goal of the section and the individual SCALE/KENO V.a features which are then covered in detail in the example problems in that section. The document contains over 100 figures, most of them in color, illustrating the CSPAN input screens, the KENO V.a geometry, and the KENO V.a example models. An example illustration of the KENO V.a basic geometry shapes is shown in Figure 1.

Upon completion of the primer, a new user should be comfortable using CSPAN to set up criticality problems in SCALE/KENO V.a.

The primer provides a starting point for the criticality safety analyst using SCALE/KENO V.a. Complete descriptions are provided in the SCALE/KENO V.a manual. Although the primer is self-contained, it is intended as a companion volume to the SCALE/KENO V.a documentation. (The SCALE manual is provided on the SCALE installation CD.) The primer provides specific examples of using SCALE/KENO V.a for criticality analyses while the documentation provides information on the use of SCALE/KENO V.a and all its modules.

AVAILABILITY

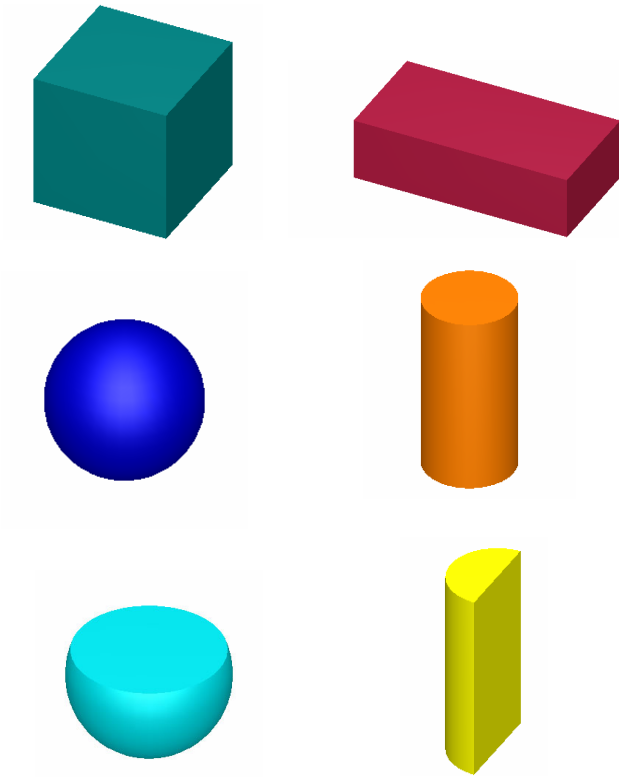The KENO V.a Primer is available to download in Acrobat PDF format from the Download page of the SCALE website: http://www.ornl.gov/scale/download.html.

Fig. 1. KENO V.a basic geometry shapes from KENO V.a Primer.

REFERENCES

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2. R. D. BUSCH, S. M. BOWMAN, *KENO V.a Primer: A Primer for Criticality Calculations with SCALE/KENO V.a Using CSPAN for Input*, ORNL/TM-2002/155, Oak Ridge National Laboratory, January, 2003.
3. S. M. BOWMAN *et al.*, "SCALE Graphical Developments for Improved Criticality Safety Analyses," **Vol. I,** 278–287, in *Proc. ICNC'99, Sixth International Conference on Nuclear Criticality Safety*, September 20–24, 1999, Palais des Congres, Versailles, FRANCE.