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Optika: A GUI Framework for Parametrized Applications (Report style, strict)

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Optika: A GUI Framework for Parametrized Applications (Report style, strict)

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Abstract

In the field of scientific computing there are many specialized programs designed for specific applications in areas like biology, chemistry, and physics. These applications are often very powerful and extraordinarily useful in their respective domains. However, many suffer from a common problem: a poor user interface. Many of these programs are homegrown, and the concern of the designer was not ease of use but rather functionality. The purpose of Optika is to address this problem and provide a simple, viable solution. Using only a list of parameters passed to it, Optika can dynamically generate a GUI. This allows the user to specify parameters values in fashion that is much more intuitive than the traditional "input decks" used by many parameterized scientific applications. By leveraging the power of Optika, these scientific applications will become more accessible and thus allow their designers to reach a much wider audience while requiring minimal extra development effort.

Acknowledgment

Thanks to Dr. Mike Heroux and Jim Willenbring. Their mentoring has been crucial to the development of Optika. Also, many thanks to the entire Trilinos Community in which Optika has found a welcoming home.

The format of this report is based on information found in [1].

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Nomenclature

Dependency A relationship ship between to parameters in which the state or value of one parameter depends on the state or value of another.

Dependee The parameter upon which another parameter state or value dependes.

Dependent A parameter whose state or value is determined by another parameter.

Parameter An input needed for a program.

Parameter List A list of parameters and other parameter lists.

RCP Refernce counted pointer. RCPs refered to in this document reference the RCP class located in the Teuchos package of Trilinos.

Sublist A parameter list contained within another parameter list.

Chapter 1

Introduction

In [3] we have shown that dry-erase markers have a use in science. In this report we address the use of dry-erase markers specifically to the science and engineering performed at the DOE national laboratories. Let us begin with a description of a couple of basic dry-erase marker drawings. We use the circle and the square to make our point.

The Circle

Figure 1.1 shows one of the basic shapes. It appears in many dry-erase drawings and has many important properties.

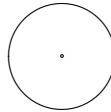


Figure 1.1. A circle is one of the basic shapes. It has many important properties. Note, for example, that every point along its circumference is at exactly the same distance from the center. A truly important property for a circle.

Whole books have been written about the circle and similar, lesser shapes. So, it would be presumptuous to attempt to even list some of its properties and uses in dry-erase marker drawings. Simply admire the shape in Figure 1.1 and its power will soon engulf you in ideas and beautiful feelings of completeness.

Small Circles

We also need an example of a subsection to make sure titles and table of content entries work for those.

And while we are at it, we might as well check paragraph spacing. Although, we will do that again in Chapter 3¹.

The Square

Figure 1.2 illustrates another famous shape. We will show some of its uses in later chapters, but we wanted to introduce it here because this is a good place for another figure.

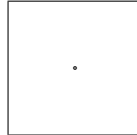


Figure 1.2. A square is another of the basic shapes. It is not quite as powerful as the circle. It has some similarities (note that the four corners all have the same distance to the center), and has many fine uses in everyday dry-erase marker drawing.

The Dot

We also need a figure with a short caption. In order to do this, we introduce the dot. Figure 1.3 shows the shape of a dot.



Figure 1.3. A simple dot

Tables and Such

In order to test our class file, we also need to have some tables. One should be enough for our purposes, so here it is: Table 1.1. On second thought, we need another one to test the list of tables with multiple entries. So, we introduce Table 1.2.

¹In strict article mode, section numbers cannot be referenced because section numbering is turned off. If you use strict mode, do not reference your sections by number. For reports you can reference chapters

Table 1.1. This superb table lists a few of the more important shapes and some of their properties. Be aware that this condensed list can by no means describe all the properties or shapes drawable by dry-erase markers.

Name	Number of corners	Importance	Shape
circle	0	high	○
square	4	medium	◇
triangle	3	low	△

Table 1.2. A magic square

1	15	14	4
12	6	7	9
8	10	11	5
13	3	2	16

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Chapter 2

A Chapter With Subfigures

The subfigure package used to cause problems until James Gruetzner and Todd Pitts found out that the subfigure package uses `addcontentsline`, which is redefined in the `SANDreport` class. The class uses the `ifthen` package, but it is not loaded at the time the subfigure package uses `addcontentsline`. The new code avoids using the `ifthen` package. Have a look at Figure 2.1 for an example.



(a) A Hyppogriff



(b) A Dragon

Figure 2.1. Creatures not drawn using dry-erase markers.

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Chapter 3

A Long Chapter

We need a long chapter to test full-page formatting. Therefore, we switch to the ancient language of Latin.

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Chapter 4

Conclusion

Of course, no report would be complete without some conclusions. This section is where they would go, if we had any.

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References

- [1] Tamara K. Locke. Guide to preparing SAND reports. Technical report SAND98-0730, Sandia National Laboratories, Albuquerque, New Mexico 87185 and Livermore, California 94550, May 1998.
- [2] Rolf Riesen. How to be conformant. *Psychology Today and Tomorrow*, 784(3):121–130, 2002.
- [3] John E. Smith. On the use of dry erase markers in science. *Journal of Pen and Pencil*, 784(3):121–130, 2002.

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Appendix A

Historical Perspective

This is an example of an appendix.

If we follow [1] strictly, we would have to have a separate bibliography section for each appendix. The style file doesn't provide that, but it can be done using the `bibunits` and `chapterbib` packages.

If there are many subsections in an appendix, it should also have its own table of contents. Again, the SAND report class file does not provide that functionality.

A.1 The Past a Long Time Ago

This is where we talk about things so old nobody can verify them. We are safe.

A.2 The Past More Recently

Now we have to be a little bit more careful, since records exist from that time, and some people still alive actually lived back then.

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Appendix B

Some Other Appendix

Just to show what a second Appendix would look like. It contains a table. Each appendix is supposed to be self-contained, so tables and figures are not supposed to show up in the main table of contents. There can be a separate table of contents for each appendix.

Table B.1. A small table

A	B
C	D

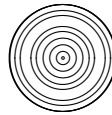


Figure B.1. Dizzy yet?

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- 1 An Address
99 99th street NW
City, State
- 3 Some Address
and street
City, State
- 12 Another Address
On a street
City, State
U.S.A.

- 1 MS 1319 Rolf Riesen, 1423
- 1 MS 1110 Another One, 01400
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