

The Last Document You'll Ever Read

by

Michael Walters

A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master
in
Physics

Waterloo, Ontario, Canada, 2019

© Michael Walters 2019

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

This is the abstract.

Vulputate minim vel consequat praesent at vel iusto et, ex delenit, esse euismod luptatum augue ut sit et eu vel augue autem feugiat, quis ad dolore. Nulla vel, laoreet lobortis te commodo elit qui aliquam enim ex iriure ea ullamcorper nostrud lorem, lorem laoreet eu ex ut vel in zzril wisi quis. Nisl in autem praesent dignissim, sit vel aliquam at te, vero dolor molestie consequat.

Tation iriure sed wisi feugait odio dolore illum duis in accumsan velit illum consequat consequat ipsum molestie duis duis ut ullamcorper. Duis exerci odio blandit vero dolore eros odio amet et nisl in nostrud consequat iusto eum suscipit autem vero. Iusto dolore exerci, ut erat ex, magna in facilisis duis amet feugait augue accumsan zzril delenit aliquip dignissim at. Nisl molestie nibh, vulputate feugait nibh luptatum ea delenit nostrud dolore minim veniam odio volutpat delenit nulla accumsan eum vero ullamcorper eum. Augue velit veniam, dolor, exerci ea feugiat nulla molestie, veniam nonummy nulla dolore tincidunt, consectetur dolore nulla ipsum commodo.

At nostrud lorem, lorem laoreet eu ex ut vel in zzril wisi. Suscipit consequat in autem praesent dignissim, sit vel aliquam at te, vero dolor molestie consequat eros tation facilisi diam dolor. Odio luptatum dolor in facilisis et facilisi et adipiscing suscipit eu iusto praesent enim, euismod consectetur feugait duis. Odio veniam et iriure ad qui nonummy aliquip at qui augue quis vel diam, nulla. Autem exerci tation iusto, hendrerit et, tation esse consequat ut velit te dignissim eu esse eros facilisis lobortis, lobortis hendrerit esse dignissim nisl. Nibh nulla minim vel consequat praesent at vel iusto et, ex delenit, esse euismod luptatum.

Ut eum vero ullamcorper eum ad velit veniam, dolor, exerci ea feugiat nulla molestie, veniam nonummy nulla. Elit tincidunt, consectetur dolore nulla ipsum commodo, ut, at qui blandit suscipit accumsan feugiat vel praesent. In dolor, ea elit suscipit nisl blandit hendrerit zzril. Sit enim, et dolore blandit illum enim duis feugiat velit consequat iriure sed wisi feugait odio dolore illum duis. Et accumsan velit illum consequat consequat ipsum molestie duis duis ut ullamcorper nulla exerci odio blandit vero dolore eros odio amet et.

In augue quis vel diam, nulla dolore exerci tation iusto, hendrerit et, tation esse consequat ut velit. Duis dignissim eu esse eros facilisis lobortis, lobortis hendrerit esse dignissim nisl illum nulla minim vel consequat praesent at vel iusto et, ex delenit, esse euismod. Nulla augue ut sit et eu vel augue autem feugiat, quis ad dolore te vel, laoreet lobortis te commodo elit qui aliquam enim ex iriure. Ut ullamcorper nostrud lorem, lorem laoreet eu ex ut vel in zzril wisi quis consequat in autem praesent dignissim, sit vel. Dolor

at te, vero dolor molestie consequat eros tation facilisi diam. Feugait augue luptatum dolor in facilisis et facilisi et adipiscing suscipit eu iusto praesent enim, euismod consectetur feugait dui vulputate veniam et.

Ad eros odio amet et nisl in nostrud consequat iusto eum suscipit autem vero enim dolore exerci, ut. Esse ex, magna in facilisis dui amet feugait augue accumsan zzril. Lobortis aliquip dignissim at, in molestie nibh, vulputate feugait nibh luptatum ea delenit nostrud dolore minim veniam odio. Euismod delenit nulla accumsan eum vero ullamcorper eum ad velit veniam. Quis, exerci ea feugiat nulla molestie, veniam nonummy nulla. Elit tincidunt, consectetur dolore nulla ipsum commodo, ut, at qui blandit suscipit accumsan feugiat vel praesent.

Dolor zzril wisi quis consequat in autem praesent dignissim, sit vel aliquam at te, vero. Duis molestie consequat eros tation facilisi diam dolor augue. Dolore dolor in facilisis et facilisi et adipiscing suscipit eu iusto praesent enim, euismod consectetur feugait dui vulputate.

Acknowledgements

I would like to thank all the little people who made this thesis possible.

Dedication

This is dedicated to me.

Table of Contents

List of Tables	viii
List of Figures	ix
Glossary	x
Abbreviations	xi
Nomenclature	xii
List of Symbols	xiii
0.1 State of the Art	1
0.2 Some Meaningless Stuff	1
References	3
APPENDICES	4
A PDF Plots From Matlab	5
A.1 Using the GUI	5
A.2 From the Command Line	5

List of Tables

List of Figures

Glossary

computer A programmable machine that receives input data, stores and manipulates the data, and provides formatted output [1](#)

Abbreviations

AAAAZ American Association of Amature Astronomers and Zoologists [1](#)

Nomenclature

dingledorf A person of supposed average intelligence who makes incredibly brainless misjudgments [1](#)

List of Symbols

- v** Random vector: a location in n-dimensional Cartesian space, where each dimensional component is determined by a random process [1](#)

Introduction

In the beginning, there was π :

$$e^{\pi i} + 1 = 0 \tag{1}$$

A [computer](#) could compute π all day long. In fact, subsets of digits of π 's decimal approximation would make a good source for psuedo-random vectors, [v](#) .

0.1 State of the Art

See equation [1](#) on page [1](#).¹

0.2 Some Meaningless Stuff

The credo of the [American Association of Amature Astronomers and Zoologists \(AAAAZ\)](#) was, for several years, several paragraphs of gibberish, until the [dingledorf](#) responsible for the [AAAAZ](#) Web site realized his mistake:

”Velit dolor illum facilisis zzril ipsum, augue odio, accumsan ea augue molestie lobortis zzril laoreet ex ad, adipiscing nulla. Veniam dolore, vel te in dolor te, feugait dolore ex vel erat dui nostrud diam commodo ad eu in consequat esse in ut wisi. Consectetuer dolore feugiat wisi eum dignissim tincidunt vel, nostrud, at vulputate eum euismod, diam minim eros consequat lorem aliquam et ad. Feugait illum sit suscipit ut, tation in dolore euismod et iusto nulla amet wisi odio quis nisl feugiat adipiscing luptatum minim nisl, quis, erat, dolore. Elit quis sit dolor veniam blandit ullamcorper ex, vero nonummy, dui exerci

¹A famous equation.

delenit ullamcorper at feugiat ullamcorper, ullamcorper elit vulputate iusto esse luptatum dui autem. Nulla nulla qui, te praesent et at nisl ut in consequat blandit vel augue ut.

Illum suscipit delenit commodo augue exerci magna veniam hendrerit dignissim dui ut feugiat amet dolor dolor suscipit iriure veniam. Vel quis enim vulputate nulla facilisis volutpat vel in, suscipit facilisis dolore ut veniam, dui facilisi wisi nulla aliquip vero praesent nibh molestie consectetur nulla. Wisi nibh exerci hendrerit consequat, nostrud lobortis ut praesent dignissim tincidunt enim eum accumsan. Lorem, nonummy dui iriure autem feugiat praesent, dui, accumsan tation enim facilisi qui te dolore magna velit, iusto esse eu, zzril. Feugiat enim zzril, te vel illum, lobortis ut tation, elit luptatum ipsum, aliquam dolor sed. Ex consectetur aliquip in, tation delenit dignissim accumsan consequat, vero, et ad eu velit ut dui ea ea odio.

Vero qui, te praesent et at nisl ut in consequat blandit vel augue ut dolor illum facilisis zzril ipsum. Exerci odio, accumsan ea augue molestie lobortis zzril laoreet ex ad, adipiscing nulla, et dolore, vel te in dolor te, feugiat dolore ex vel erat dui. Ut diam commodo ad eu in consequat esse in ut wisi aliquip dolore feugiat wisi eum dignissim tincidunt vel, nostrud. Ut vulputate eum euismod, diam minim eros consequat lorem aliquam et ad luptatum illum sit suscipit ut, tation in dolore euismod et iusto nulla. Iusto wisi odio quis nisl feugiat adipiscing luptatum minim. Illum, quis, erat, dolore qui quis sit dolor veniam blandit ullamcorper ex, vero nonummy, dui exerci delenit ullamcorper at feugiat. Et, ullamcorper elit vulputate iusto esse luptatum dui autem esse nulla qui.

Praesent dolore et, delenit, laoreet dolore sed eros hendrerit consequat lobortis. Dolor nulla suscipit delenit commodo augue exerci magna veniam hendrerit dignissim dui ut feugiat amet. Ad dolor suscipit iriure veniam blandit quis enim vulputate nulla facilisis volutpat vel in. Erat facilisis dolore ut veniam, dui facilisi wisi nulla aliquip vero praesent nibh molestie consectetur nulla, iriure nibh exerci hendrerit. Vel, nostrud lobortis ut praesent dignissim tincidunt enim eum accumsan ea, nonummy dui. Ad autem feugiat praesent, dui, accumsan tation enim facilisi qui te dolore magna velit, iusto esse eu, zzril vel enim zzril, te. Nisl illum, lobortis ut tation, elit luptatum ipsum, aliquam dolor sed minim consectetur aliquip.

Tation exerci delenit ullamcorper at feugiat ullamcorper, ullamcorper elit vulputate iusto esse luptatum dui autem esse nulla qui. Volutpat praesent et at nisl ut in consequat blandit vel augue ut dolor illum facilisis zzril ipsum, augue odio, accumsan ea augue molestie lobortis zzril laoreet. Ex dui, te velit illum odio, nisl qui consequat aliquip qui blandit hendrerit. Ea dolor nonummy ullamcorper nulla lorem tation laoreet in ea, ullamcorper vel consequat zzril delenit quis dignissim, vulputate tincidunt ut.”

References

- [1] Michel Goossens, Frank Mittelbach, and Alexander Samarin. *The L^AT_EX Companion*. Addison-Wesley, Reading, Massachusetts, 1994.
- [2] Donald Knuth. *The T_EXbook*. Addison-Wesley, Reading, Massachusetts, 1986.
- [3] Leslie Lamport. *L^AT_EX — A Document Preparation System*. Addison-Wesley, Reading, Massachusetts, second edition, 1994.

APPENDICES

Appendix A

Matlab Code for Making a PDF Plot

A.1 Using the GUI

Properties of Matab plots can be adjusted from the plot window via a graphical interface. Under the Desktop menu in the Figure window, select the Property Editor. You may also want to check the Plot Browser and Figure Palette for more tools. To adjust properties of the axes, look under the Edit menu and select Axes Properties.

To set the figure size and to save as PDF or other file formats, click the Export Setup button in the figure Property Editor.

A.2 From the Command Line

All figure properties can also be manipulated from the command line. Here's an example:

```
x=[0:0.1:pi];
hold on % Plot multiple traces on one figure
plot(x,sin(x))
plot(x,cos(x),'--r')
plot(x,tan(x),'.-g')
title('Some Trig Functions Over 0 to \pi') % Note LaTeX markup!
legend('{\it sin}(x)', '{\it cos}(x)', '{\it tan}(x)')
hold off
```

```
set(gca,'Ylim',[-3 3]) % Adjust Y limits of "current axes"  
set(gcf,'Units','inches') % Set figure size units of "current figure"  
set(gcf,'Position',[0,0,6,4]) % Set figure width (6 in.) and height (4 in.)  
cd n:\thesis\plots % Select where to save  
print -dpdf plot.pdf % Save as PDF
```