

# Abstract

This report describes how the construction tool SCons can be used to produce reproducible documents in computer based science. Moreover, the report itself is a tutorial of how various codes can be compiled, data downloaded and different third part programs used for producing figures for scientific articles. The project is available on <https://github.com/TobbeTripitaka/Reproduce> and the scripts is generously commented. The document also contains some build in errors and challenges to demonstrate methods to deal with them.

## 1 Introduction

Reproducibility has been discussed for a long time. Boyle. Geophysics. Scons. Wavelab. Madagascar.

This report and tutorial builds on these experiences and suggest a few new approaches.

Signal processing: Even if your document is not perfectly reproducible there is no excuse not to



do what you can.

## 2 History of reproducibility

### 2.1 The bird in the vacuumpump

### 2.2 Computunal reproducibility

### 2.3 Geophysical packages and methods

## 3 Tools to generate reproducible research

### 3.1 Scons

SCons is a make tool. It is based on dependencies.

This is the heart of this reproducible project.

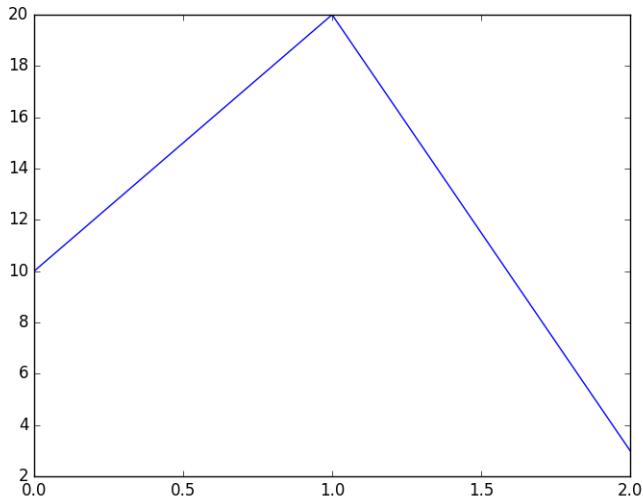
### 3.2 LaTeX

LaTeX has been around Knuth. Learning curve online examples,

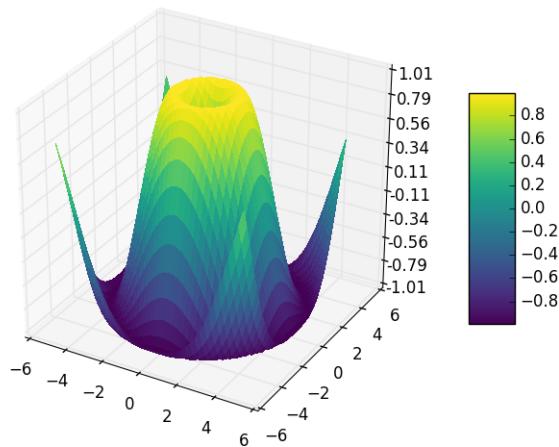
Some of the computations can also be performed in LaTeX, plots of functions. Vector graphics can be generated by using TikZ. Bibliography.

This document is written in LaTeX.

Here is a plot generated in matplotlib from the script result1.py:



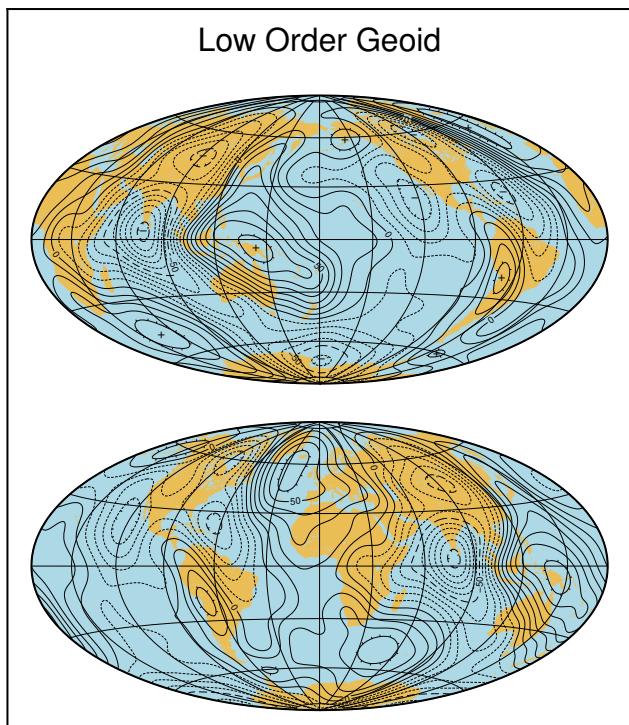
Here is a more complex plot, also generated from matplotlib.



Here is some more text, imported from a textfile generated by a python script.

Python calculations generated by a Python script.

And here is a map generated by a shellscript



NEW 1846

# EXPERIMENTS

*Physico-Mechanicall,*  
Touching  
**The SPRING of the AIR,**  
and its EFFECTS,  
(Made, for the most part, in a New  
*PNEUMATICAL ENGINE*)

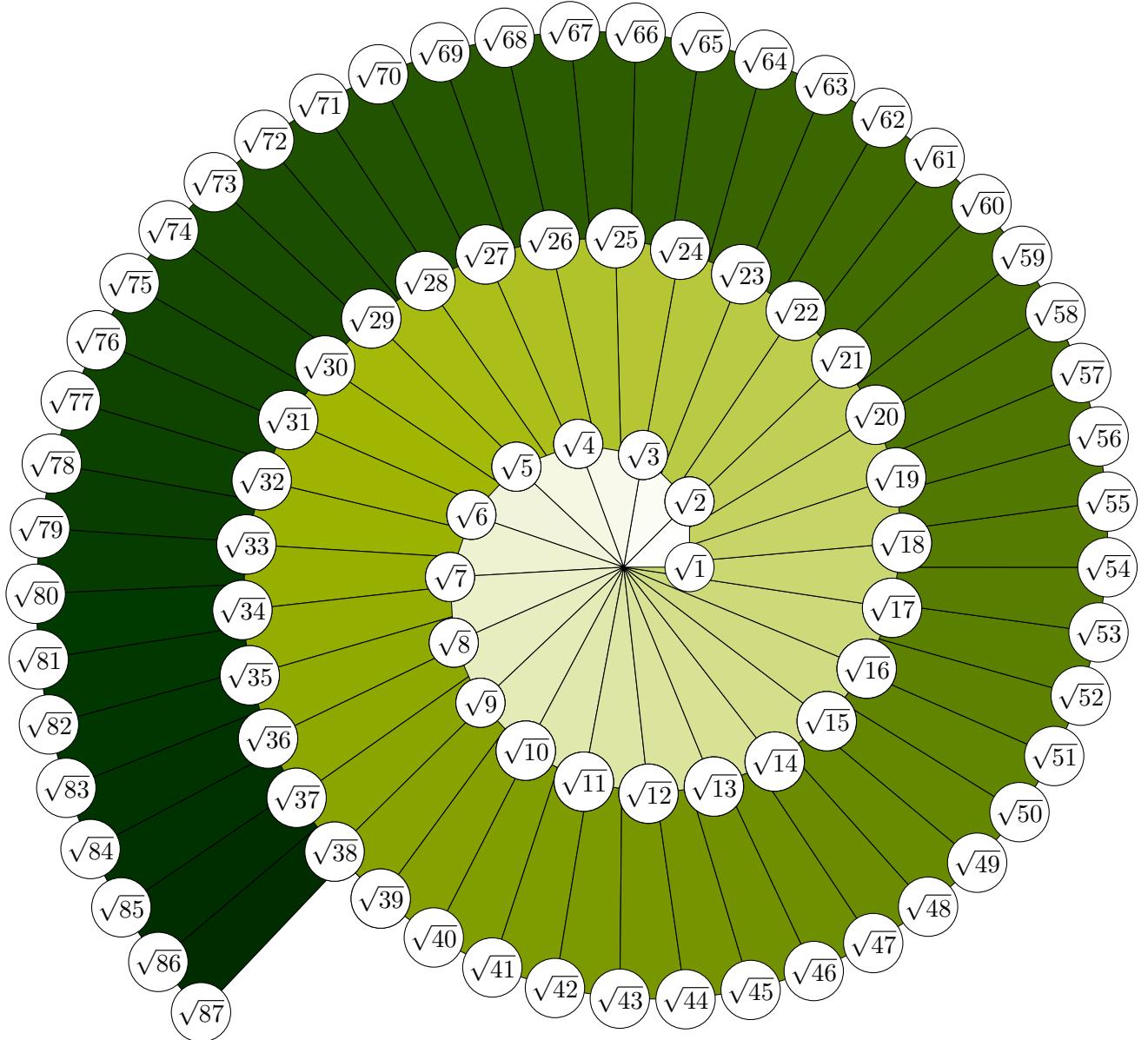
Written by way of LETTER  
To the Right Honorable *Charles.*  
Lord Vicount of *Dungarvan,*  
Eldest Son to the E A R L of CORKE.

By the Honorable *Robert Boyle Esq;*



August OXFORD:  
Printed by *H: Hall*, Printer to the University,  
for *Tho: Robinson.* 1660.

And here is a map generated directly by shell commands in the SConstruct file.  
Here will be a tikZ illustration.



And biography.

And maybe a madagascar exemple.