

Week 6: Types of Viz and Choosing Colors

Spring 2017
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Broadcasting

go.ischool.illinois.edu/meet2

Where You Should Be

- Loading simple datasets
- Filtering
 - Relationship filtering
 - Sampling and subsampling
 - Binning
- Mutation
 - Transforming a column
- Functions and Classes
 - Designing for reusability
 - Emitting new instances of classes
- Visualizing data
 - Line, scatter, histogramming and binning
 - Modifying axes
 - Styling plots manually and automatically
 - Simple image plots

Today

- Types of Visualizations: Part I
 - “If this, then that...”
 - Relationships
 - Distributions
- Understanding Color
 - How do eyes work?
 - What are colors?
 - Colormaps and palettes
- Taking our Dataset object and making it reusable
 - What goes in a toolbox?
 - How can we make a toolbox?

Next Week

- Types of Visualizations: Part II
 - Comparisons
 - Compositions
- Time Series Data

Rest of the Term: Toolbox

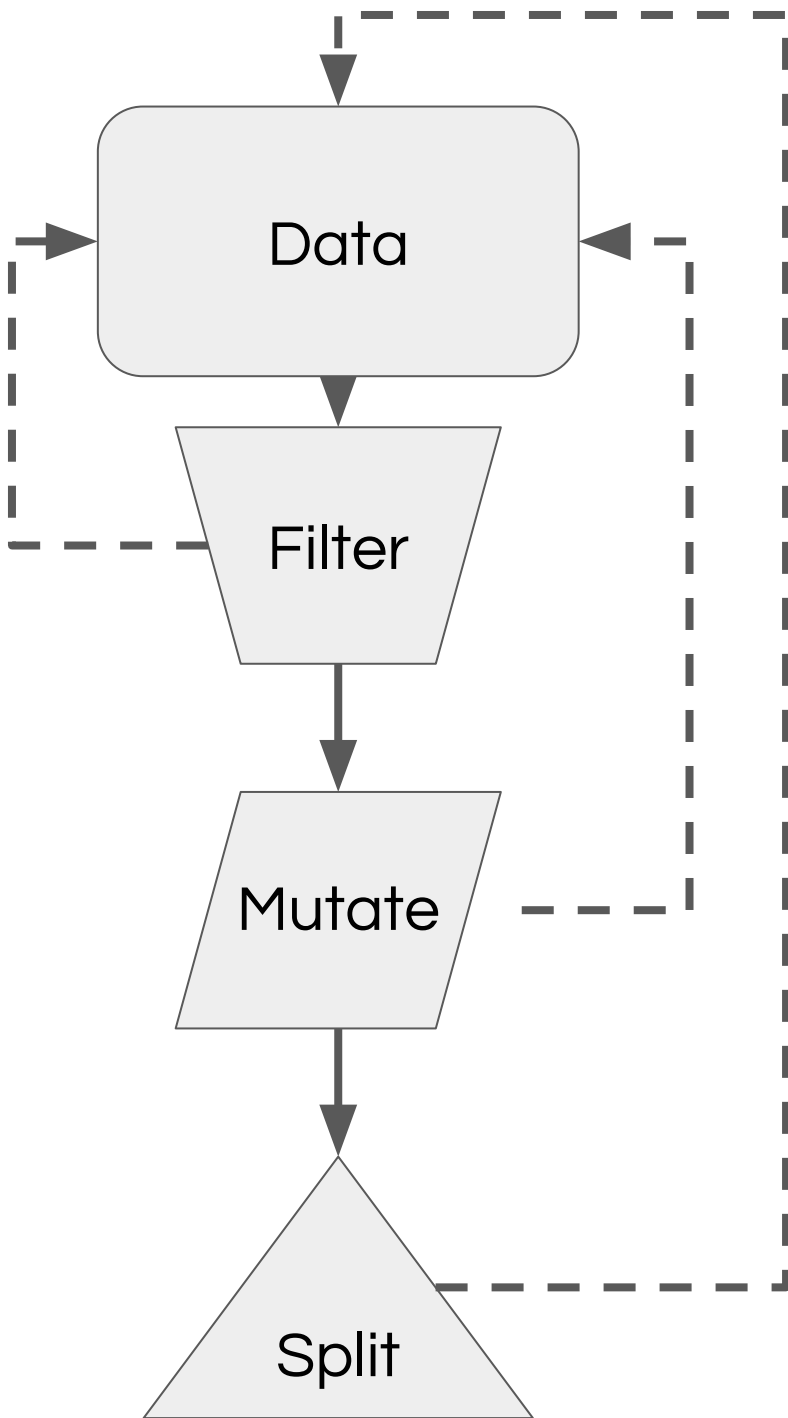
Over the course of the rest of the term, you will be adding to your Dataset object and your routine of functions.

- Reusability
- Application to new datasets
- Fast exploration

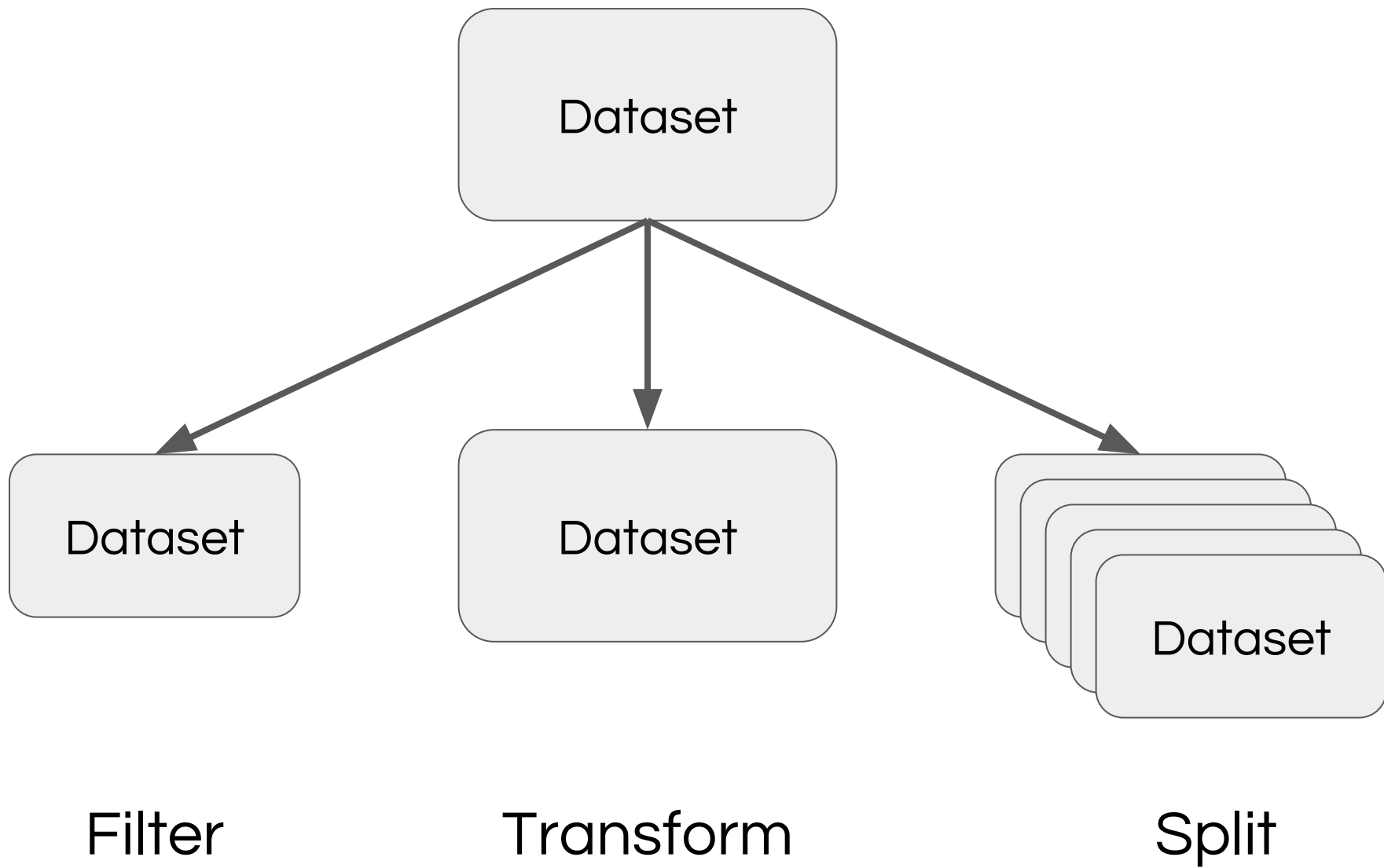
Concepts of Visualization

Transformation

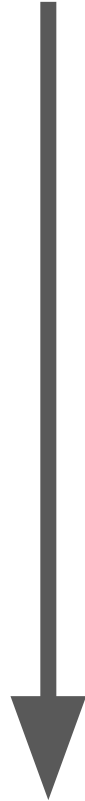




We have covered these, building out a Dataset class.



Concepts of Visualization

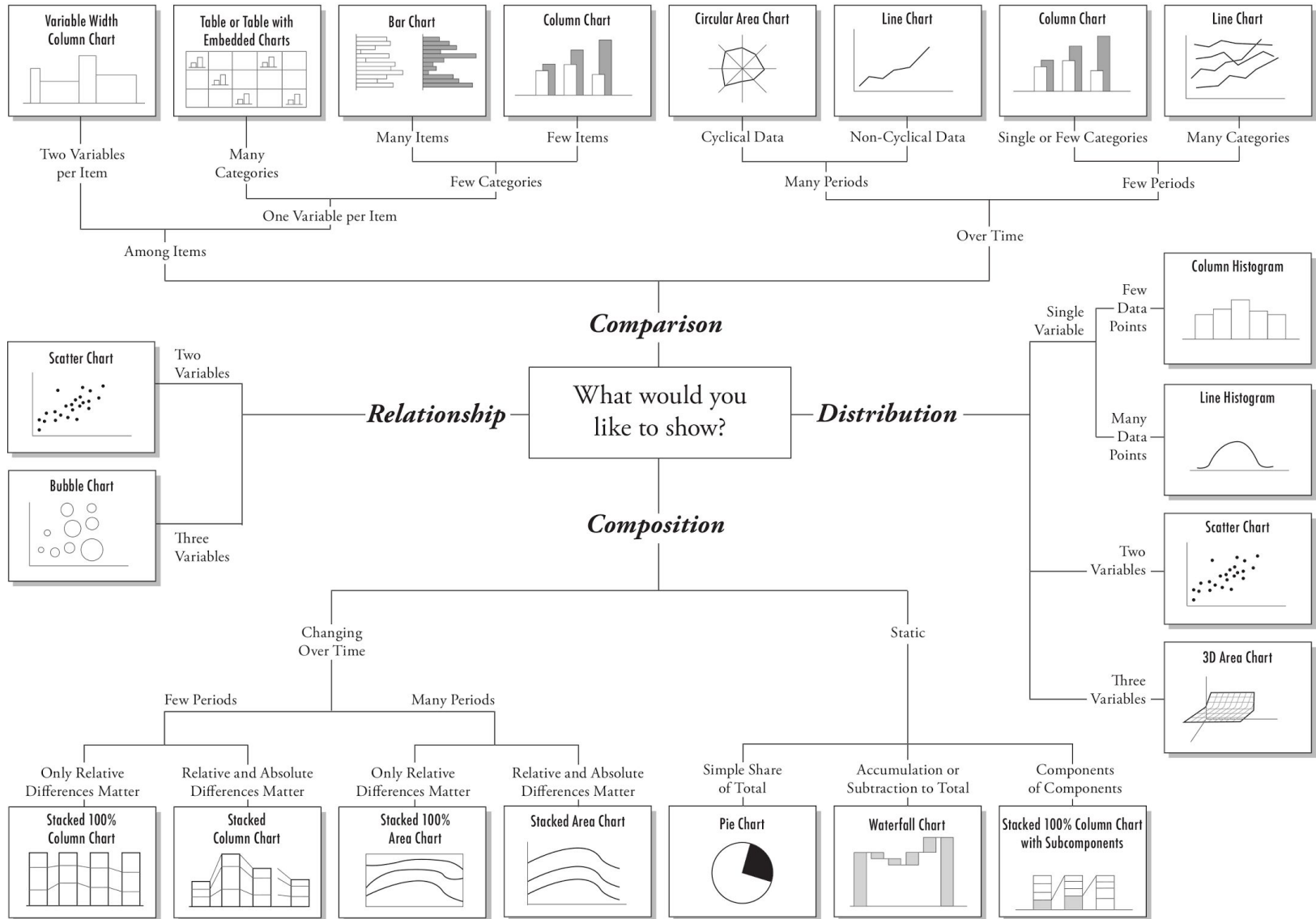


Composition

Choosing Your Visualization

- Do you understand the type of data you are examining?
- What types of relationships do you want to explore?

Chart Suggestions—A Thought-Starter

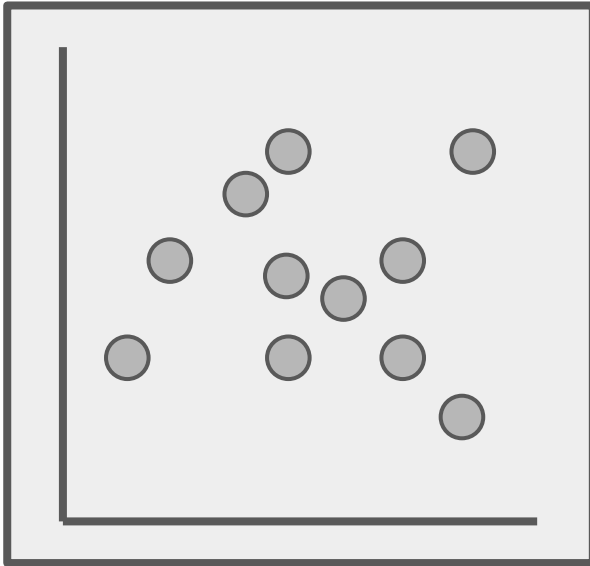


Choosing Your Visualization

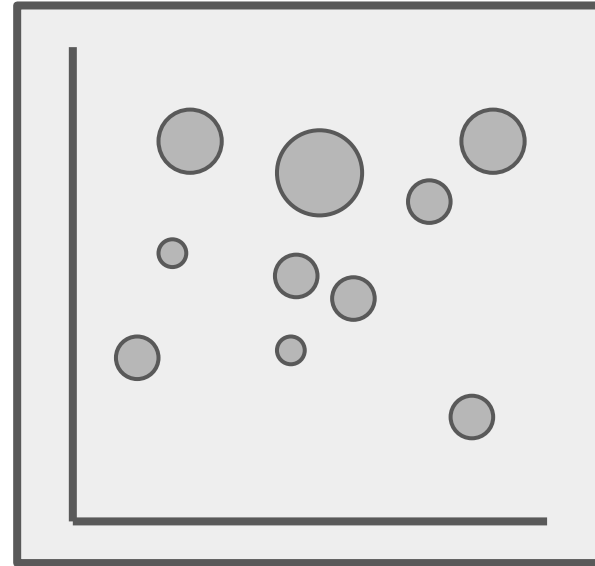
Abela's Categories:

- Relationship
- Comparison
- Distribution
- Composition

Relationship



Two Variables
(Scatter)



Three Variables
(Bubble)

- Latitude & Longitude
- Diameter
- Tree Species
- Number of Trunks
- Location Type
- Common Name

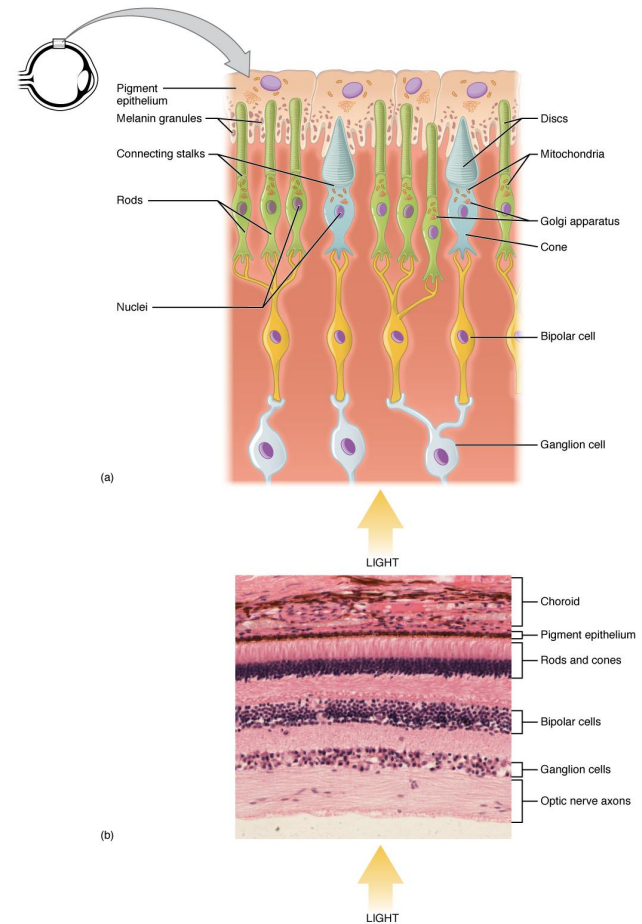
- Project Description
- Project Cost
- Square Feet Added
- Parcel Number
- Permit Number
- Building Type
- Year
- City

Comparison

- Among items
 - One variable per item
 - Two variables per item
- Over time
 - Many periods
 - Cyclical
 - Non-Cyclical
 - Few periods
 - Single or few categories
 - Many categories

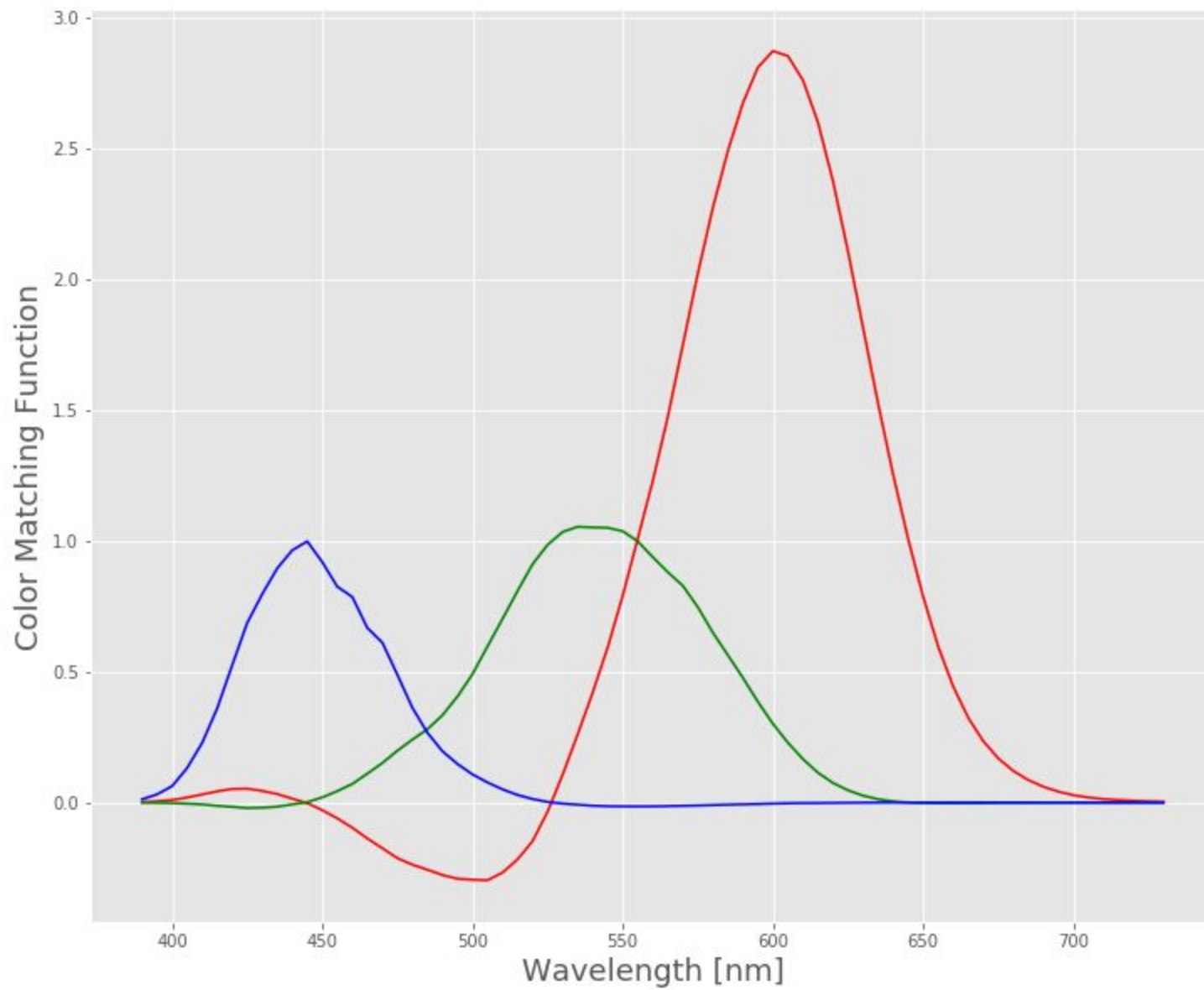
Color

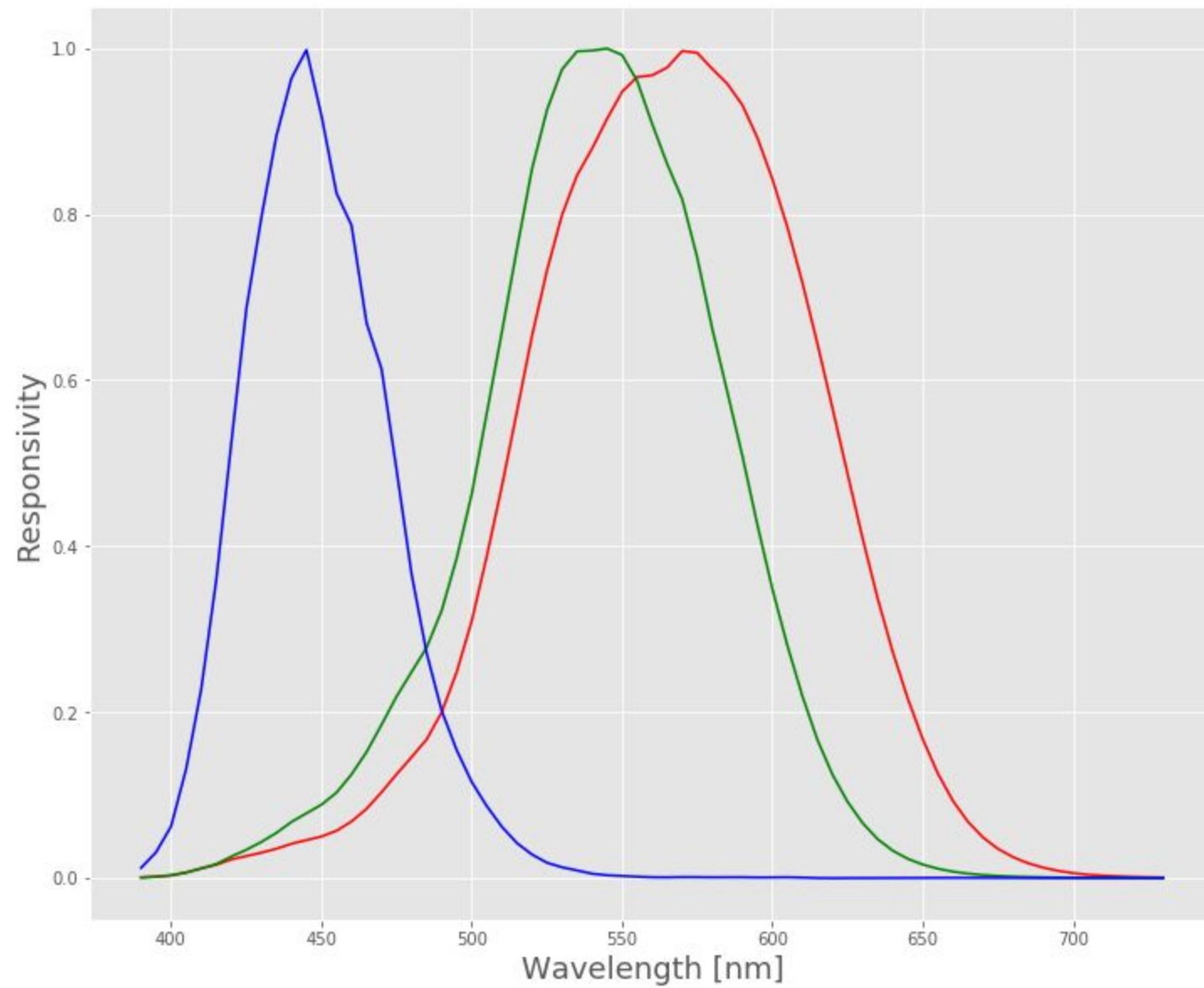
Rods (low-light) and cones (color) mediate vision. Humans have about 20 times as many rods (120 million) as cones (6 million).



https://upload.wikimedia.org/wikipedia/commons/e/e8/1414_Rods_and_Cones.jpg

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Color Palettes

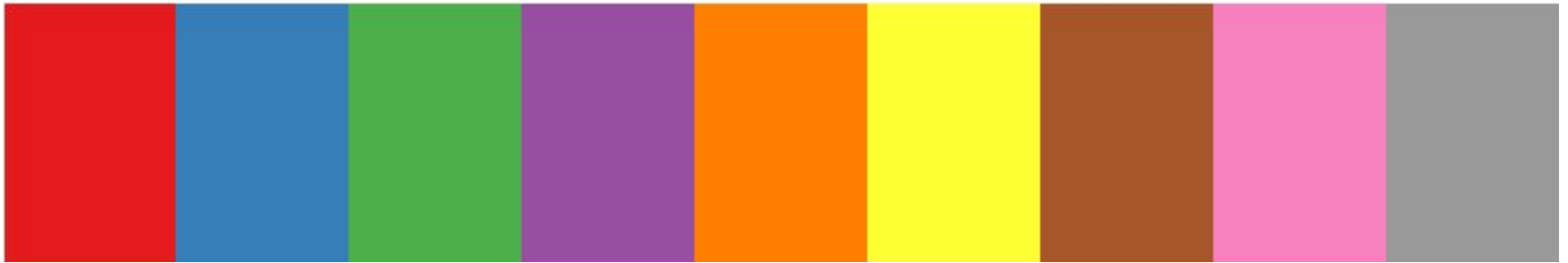
Colorbrewer Categories

- Sequential
- Diverging
- Qualitative

Resources:

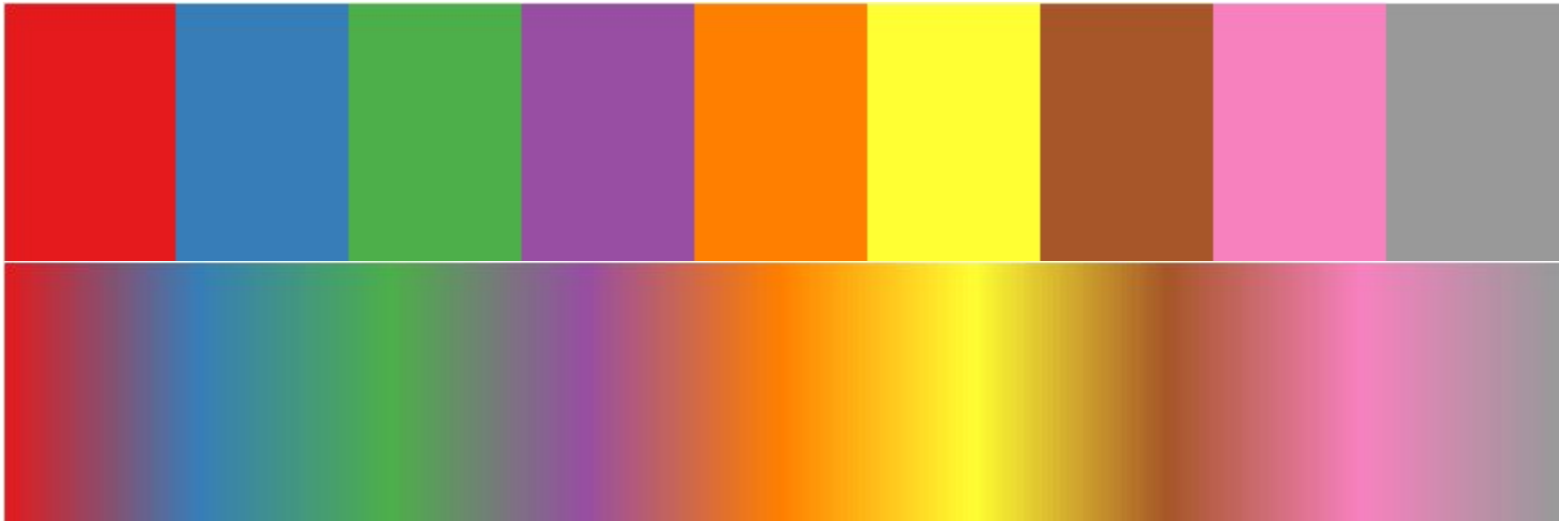
- colorbrewer.org
- `palettable` (package)

Qualitative



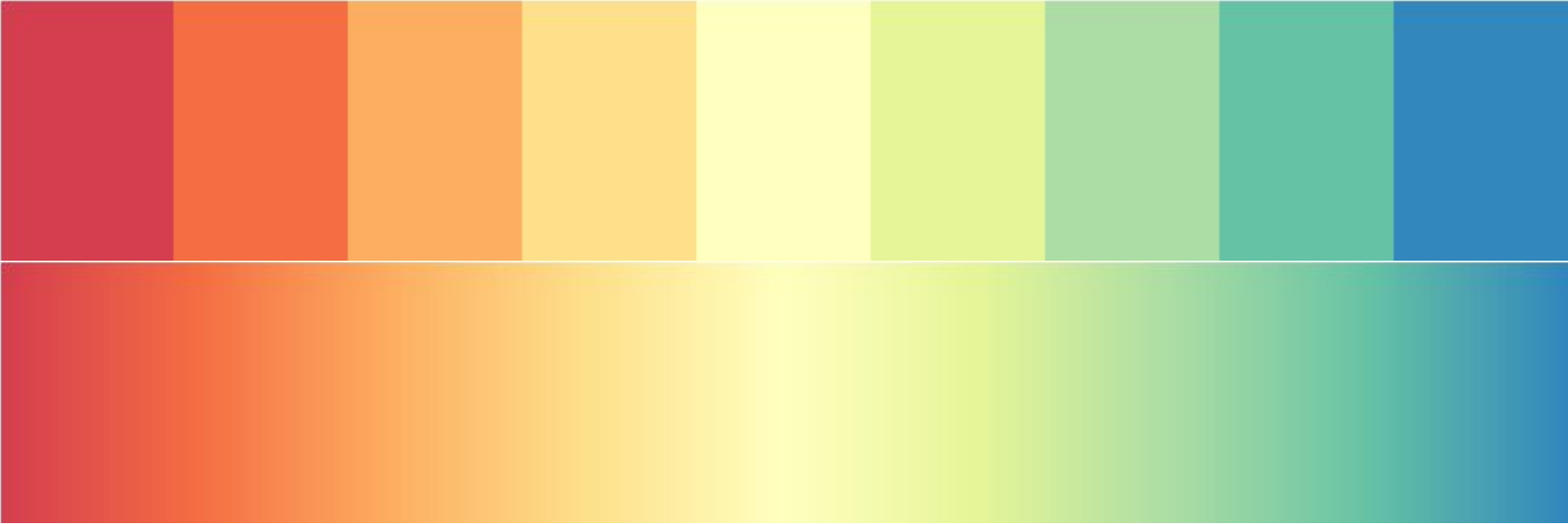
Colorbrewer Set1

Qualitative



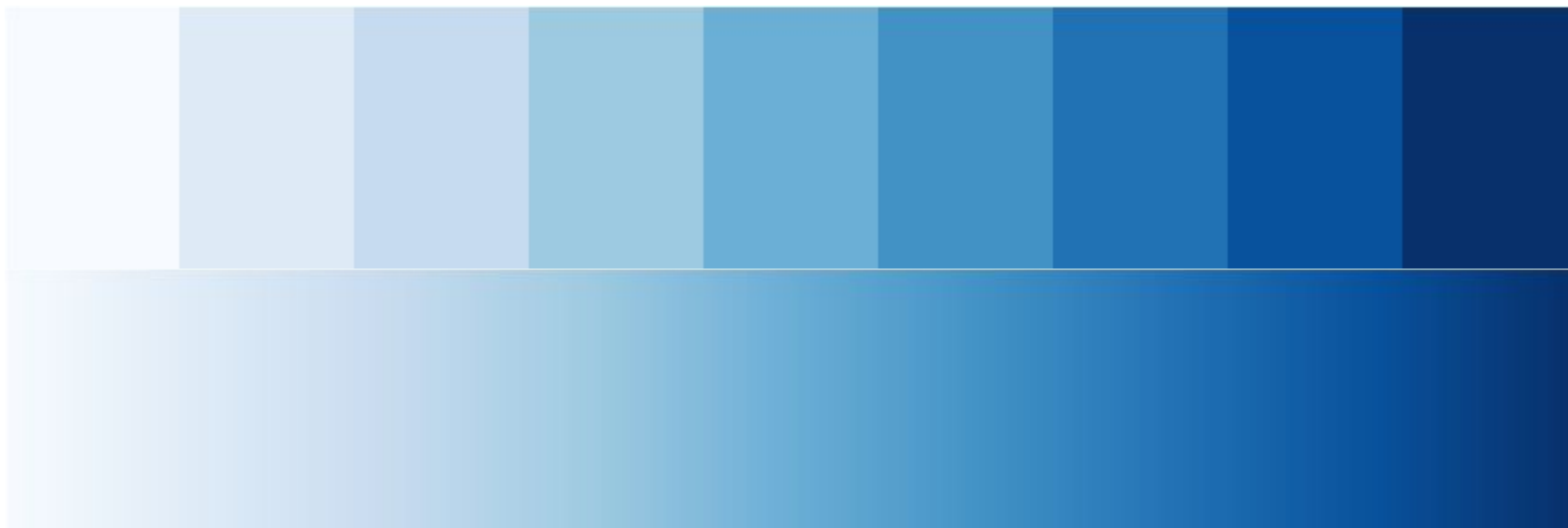
Colorbrewer Set1

Diverging



Colorbrewer Spectral

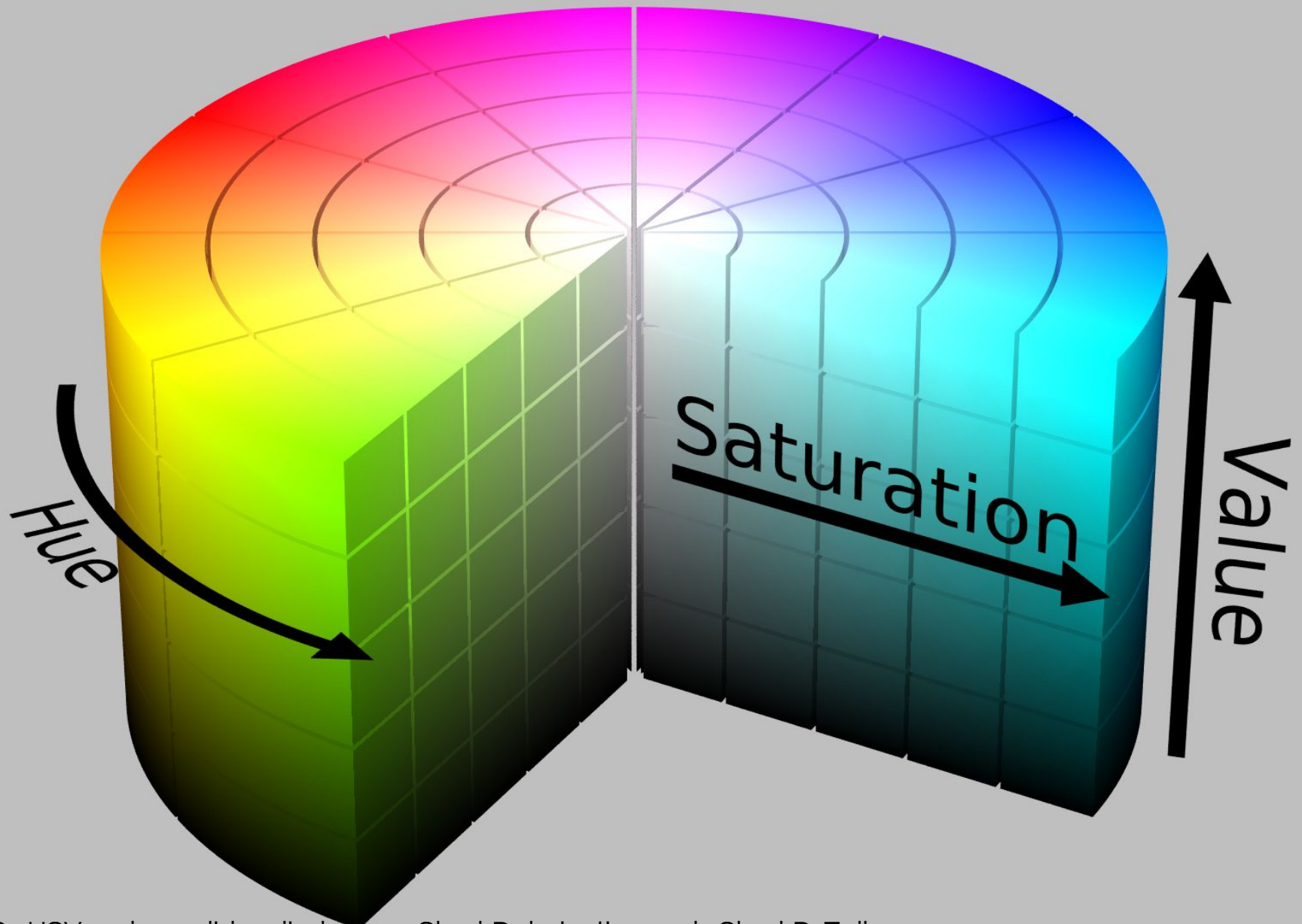
Sequential



Colorbrewer Blues

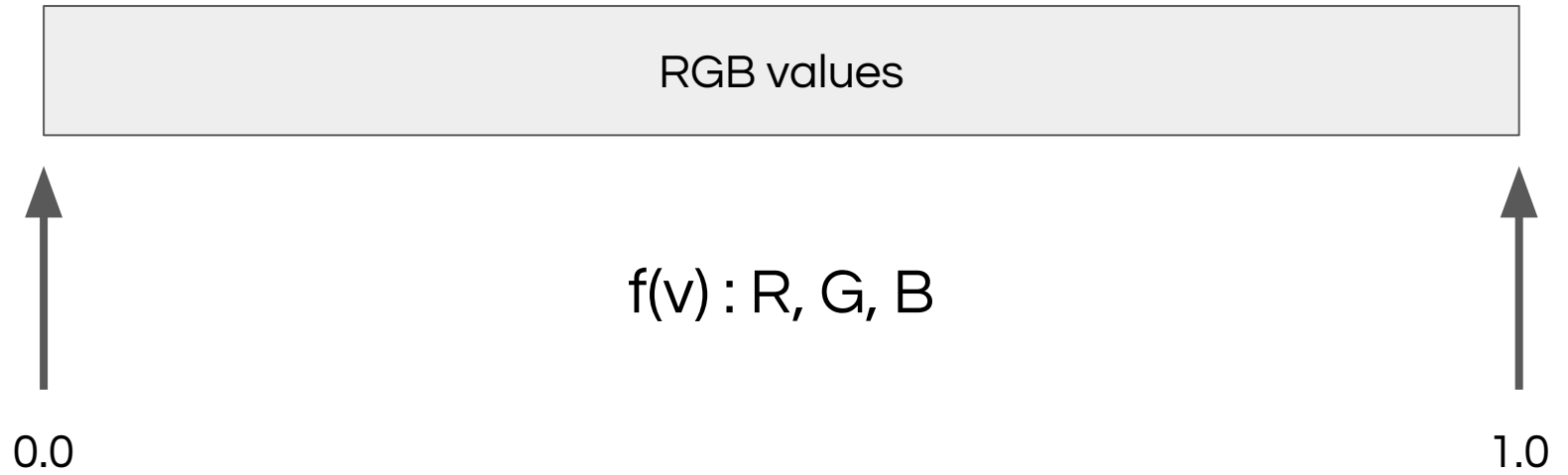


<https://commons.wikimedia.org/wiki/File:16777216colors.png>

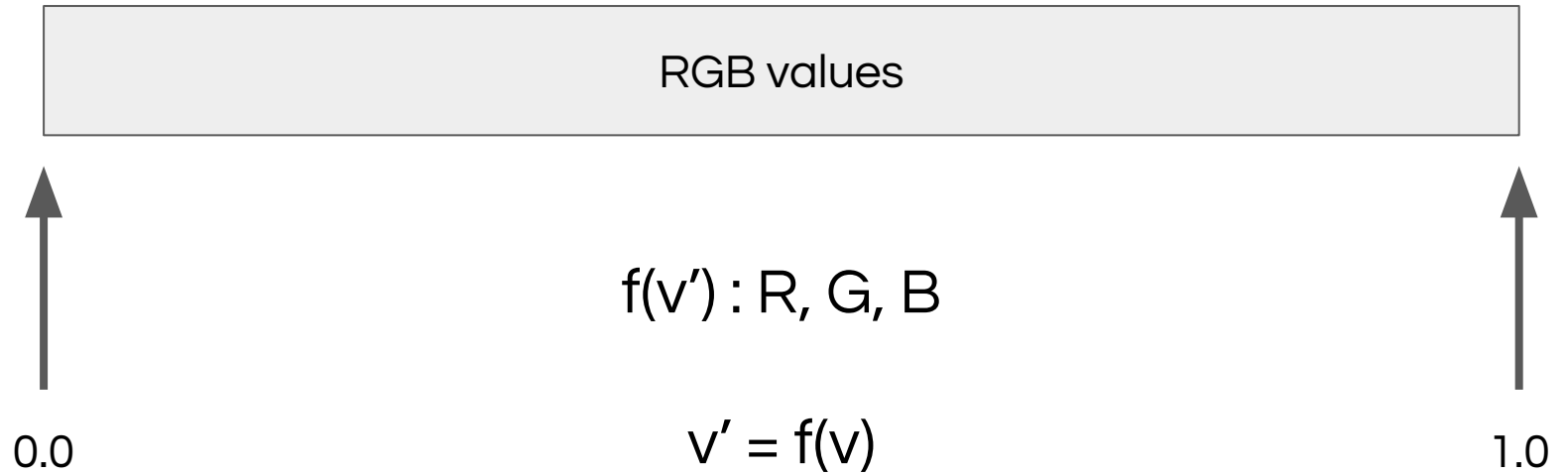


By HSV_color_solid_cylinder.png: SharkD derivative work: SharkD Talk
(HSV_color_solid_cylinder.png) [CC BY-SA 3.0 (<http://creativecommons.org/licenses/by-sa/3.0>) or
GFDL (<http://www.gnu.org/copyleft/fdl.html>)], via Wikimedia Commons

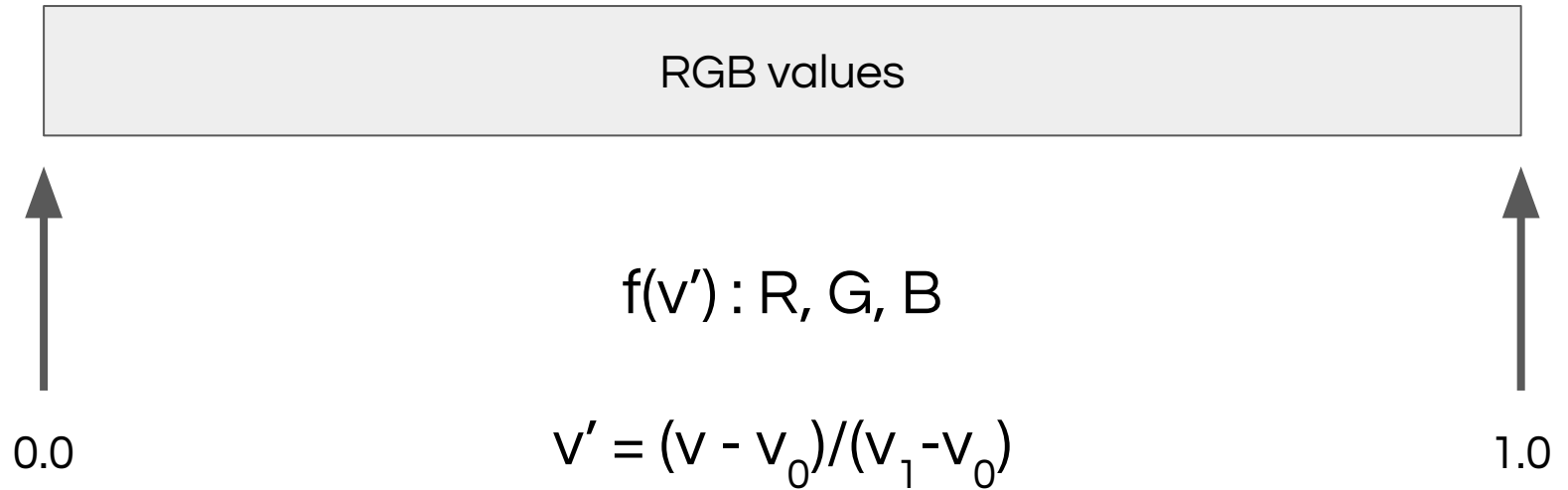
Color Mapping



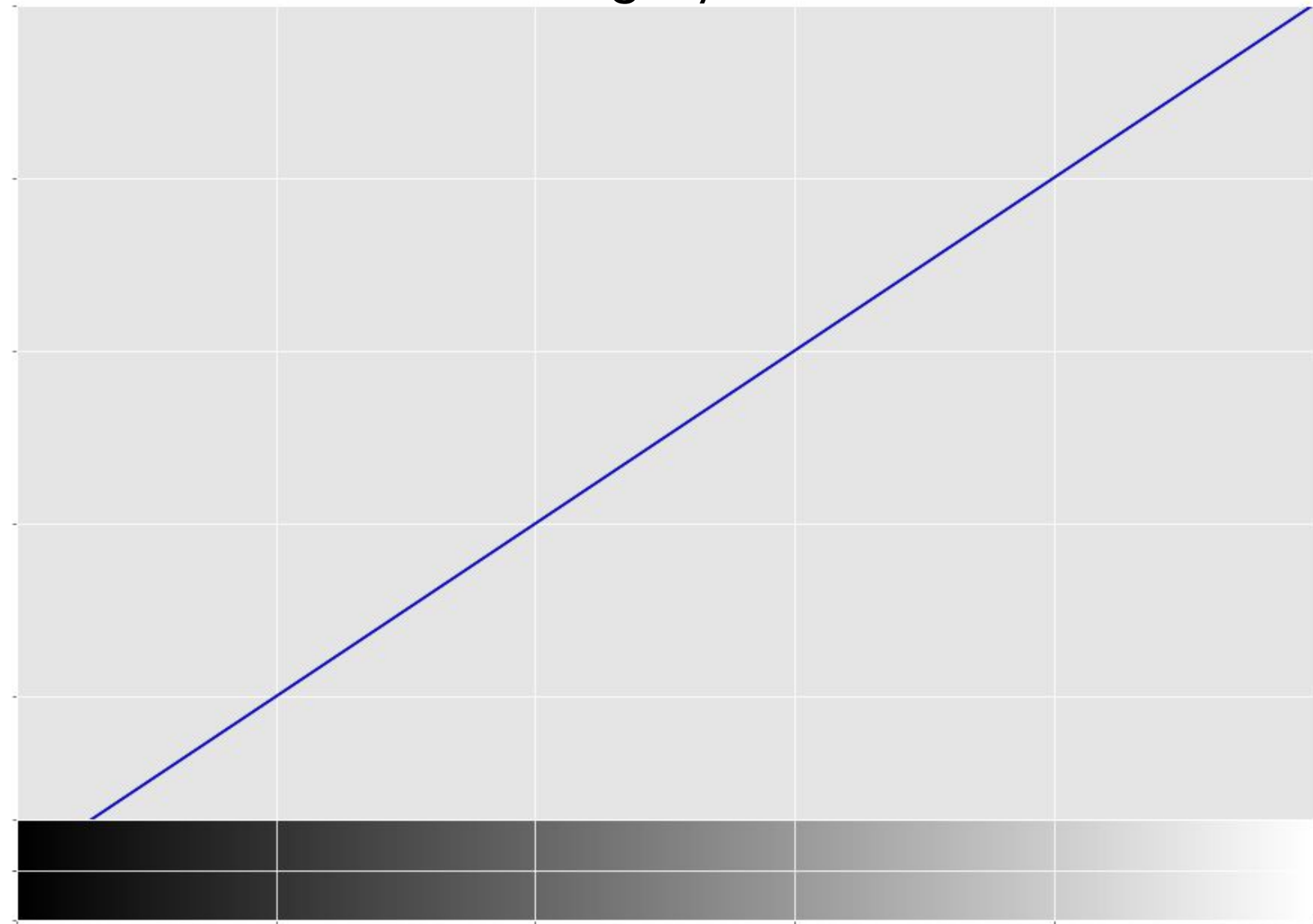
Color Mapping



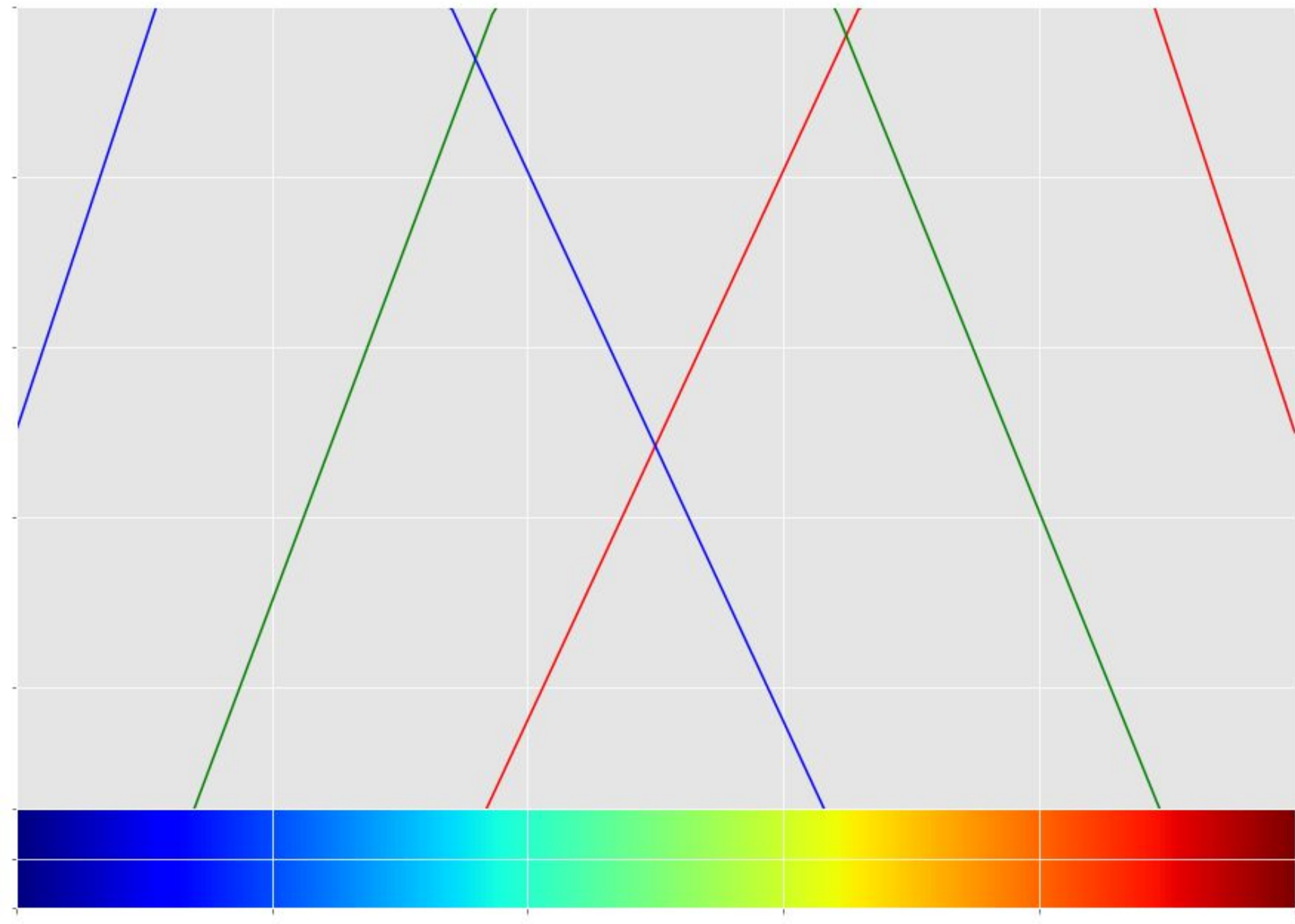
Color Mapping



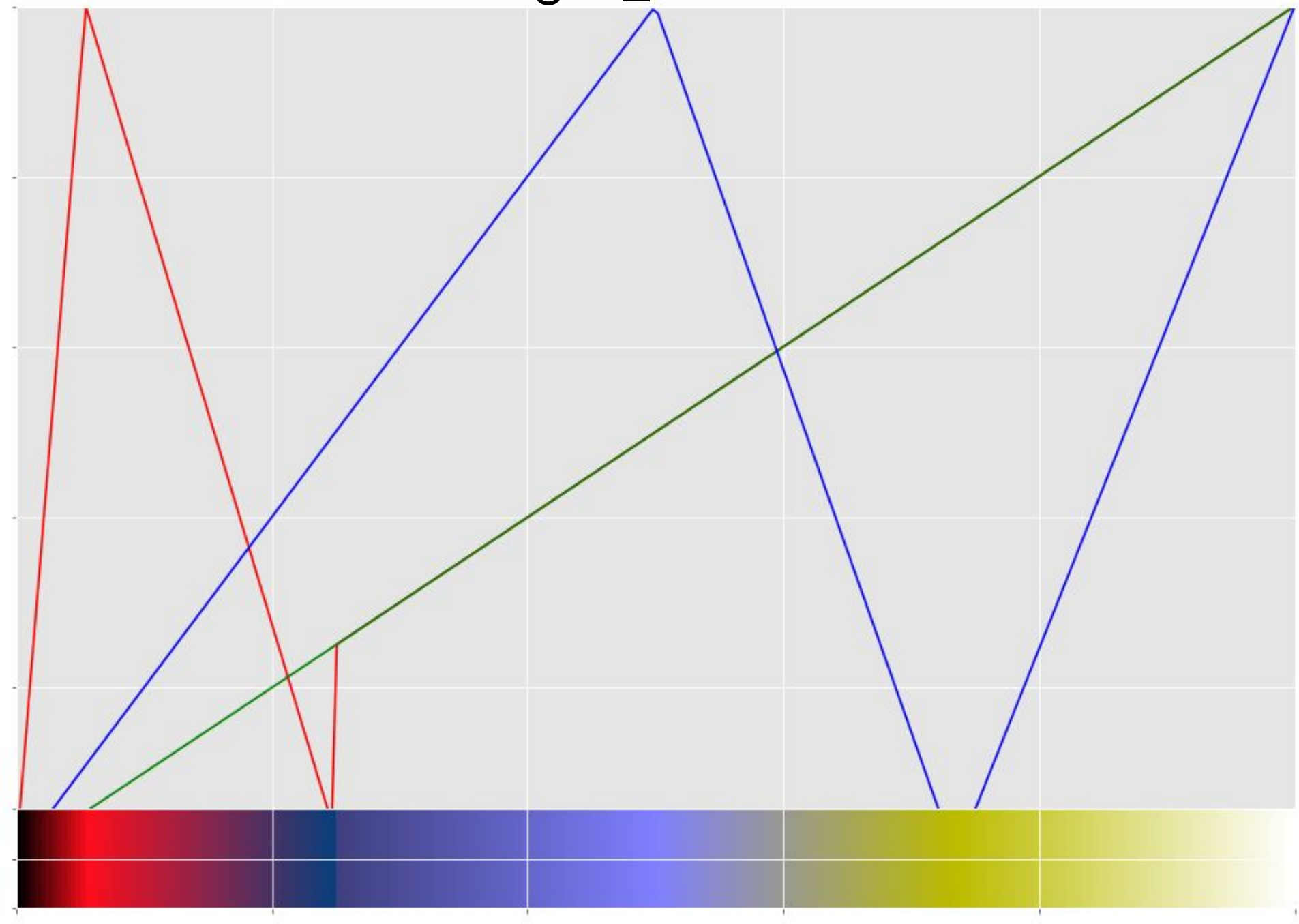
gray



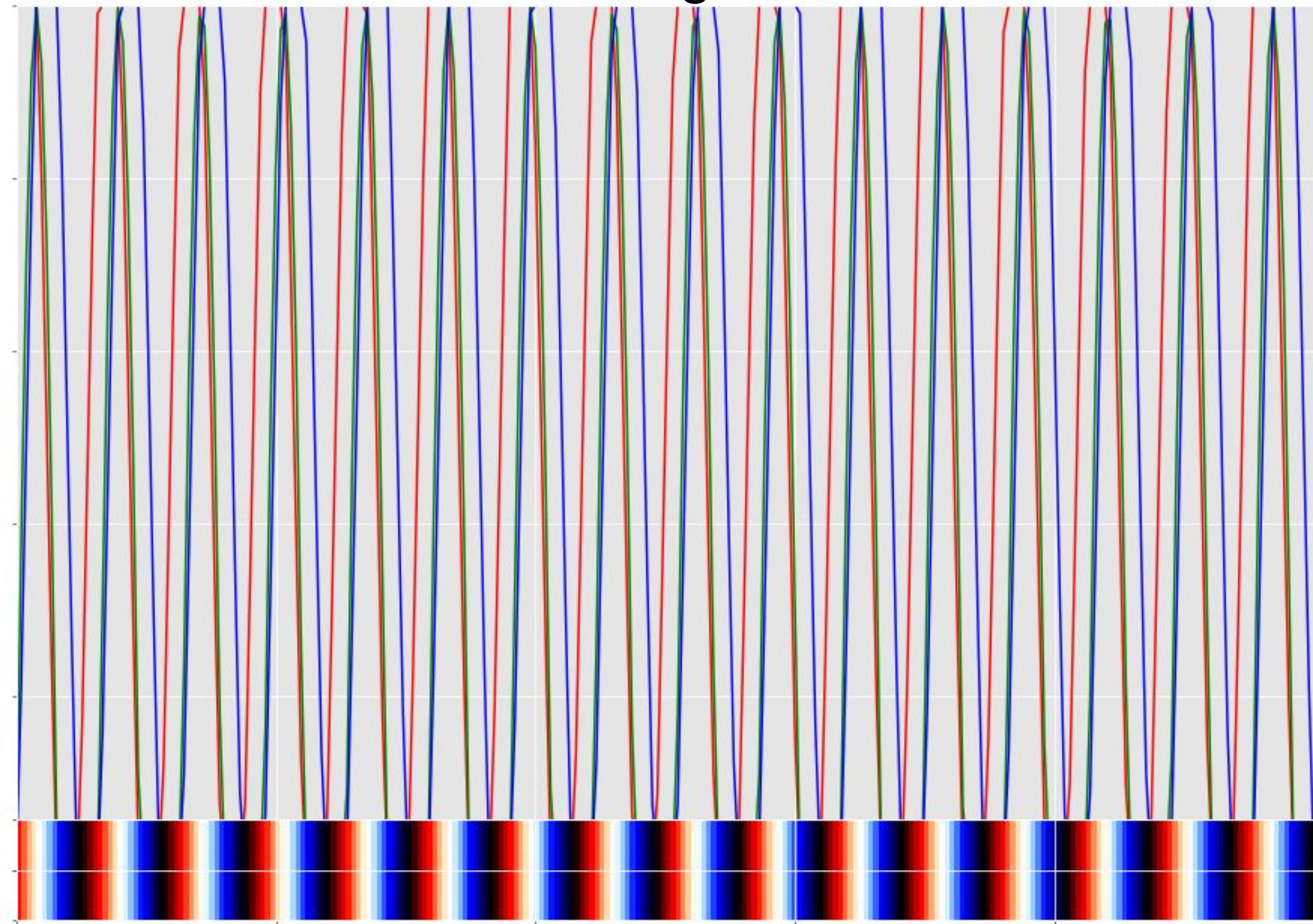
Jet



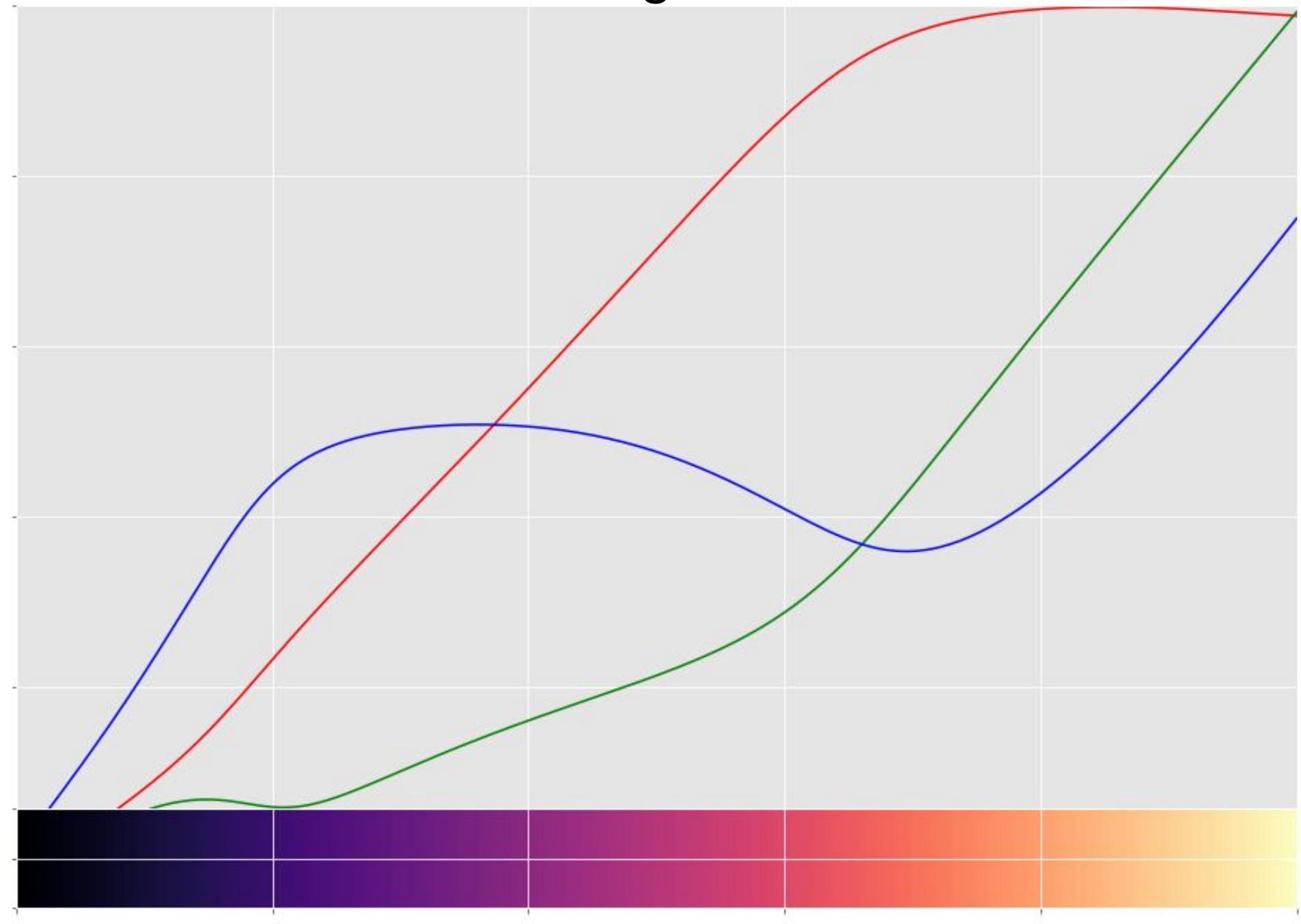
gist_stern



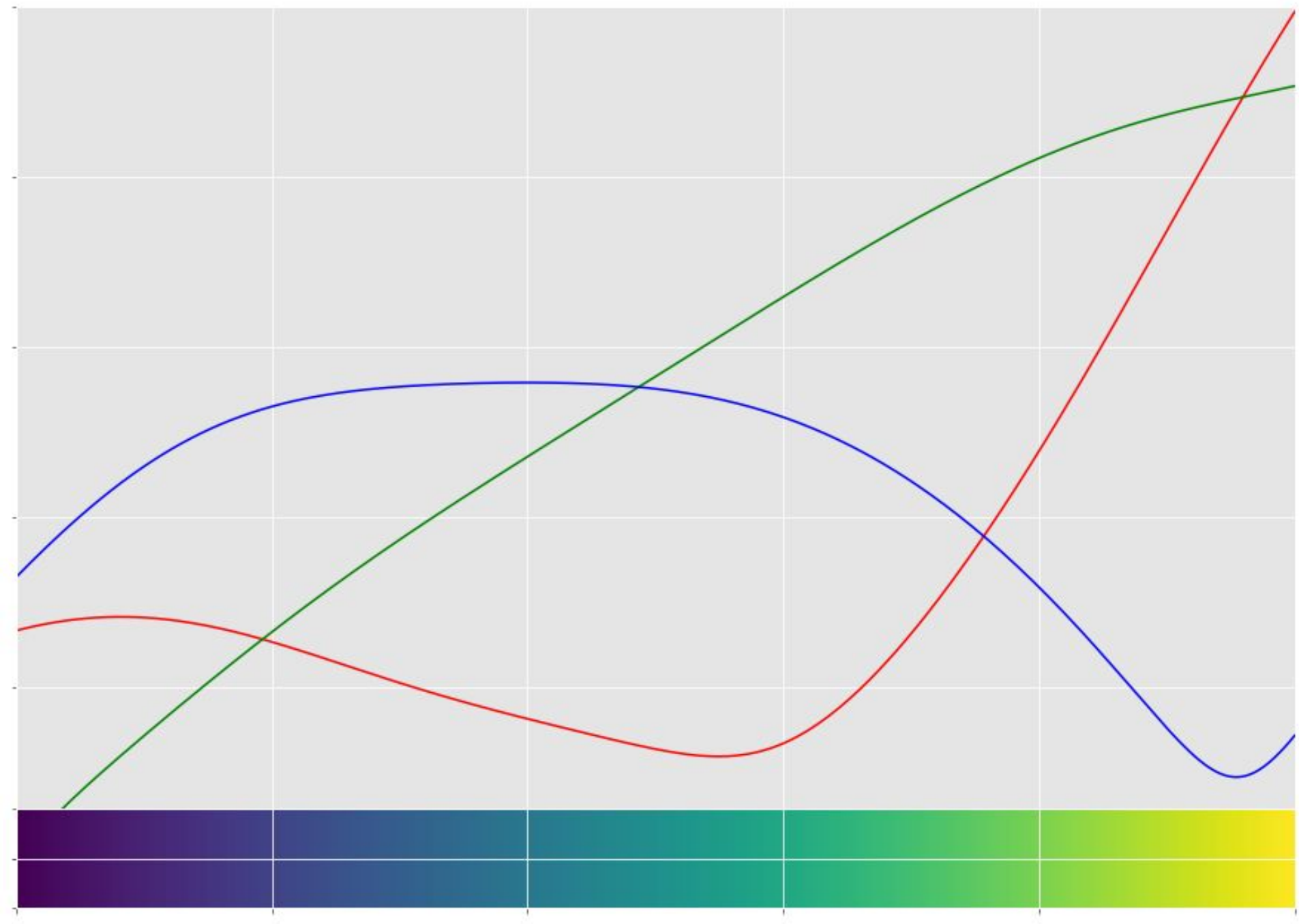
flag

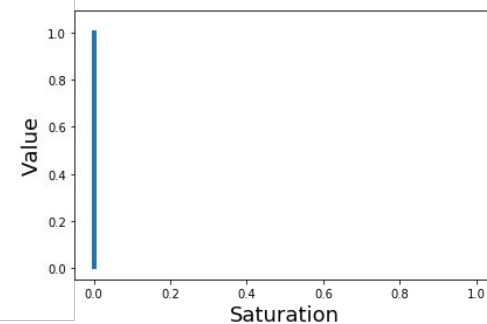
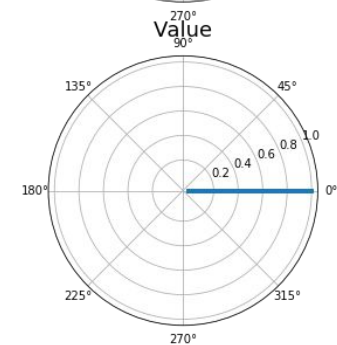
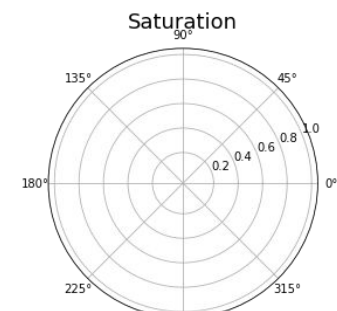
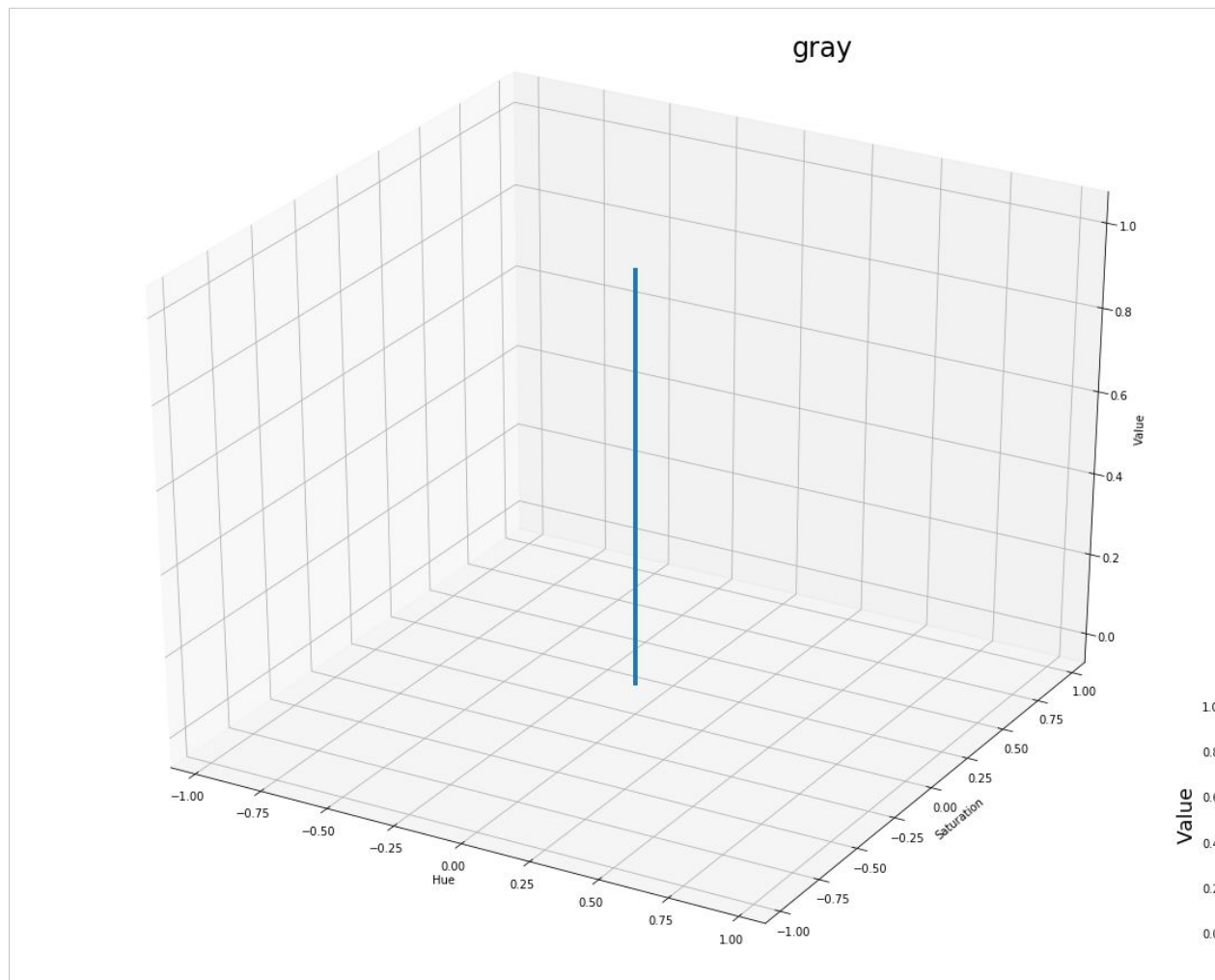


magma



Viridis

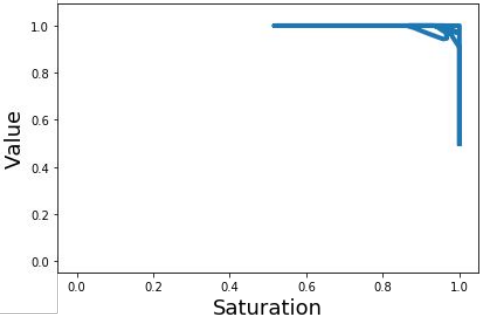
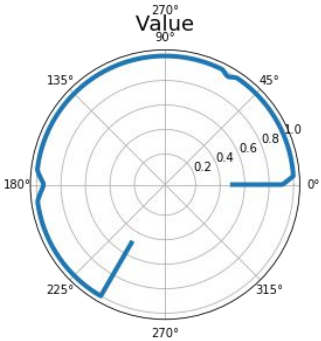
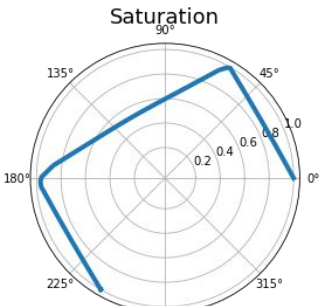
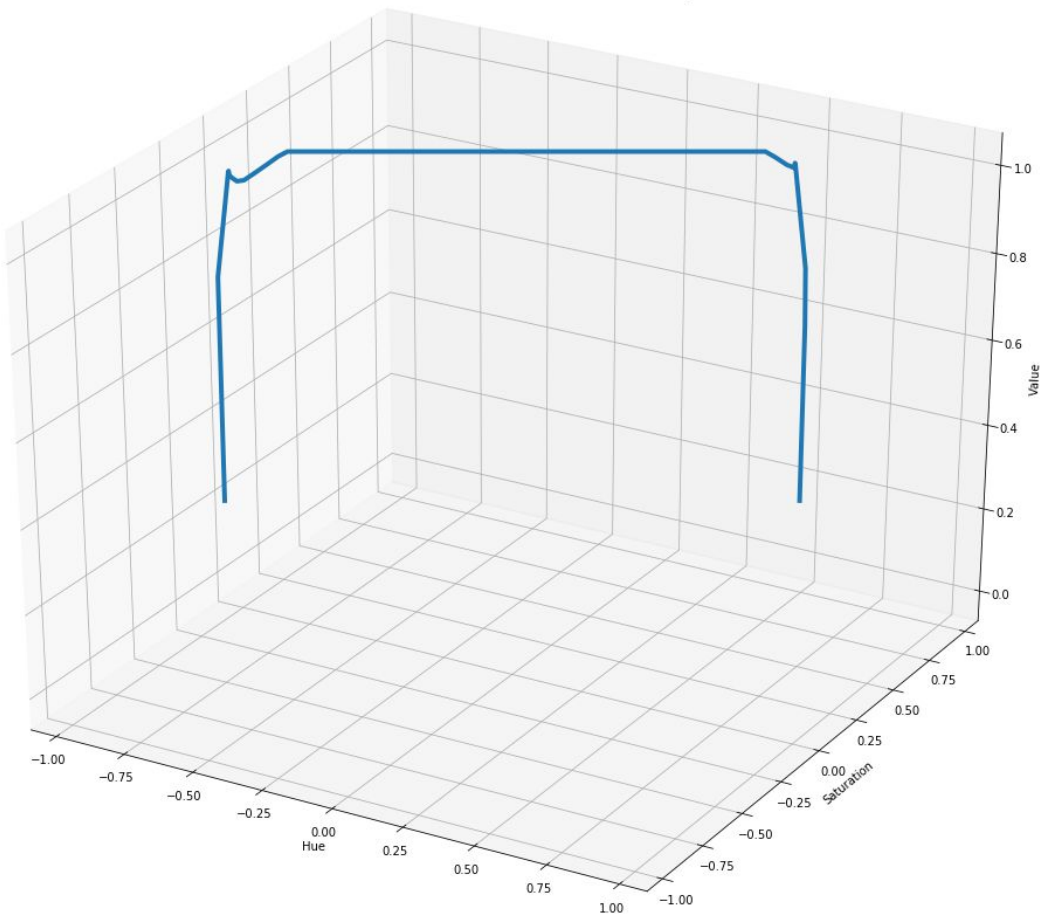




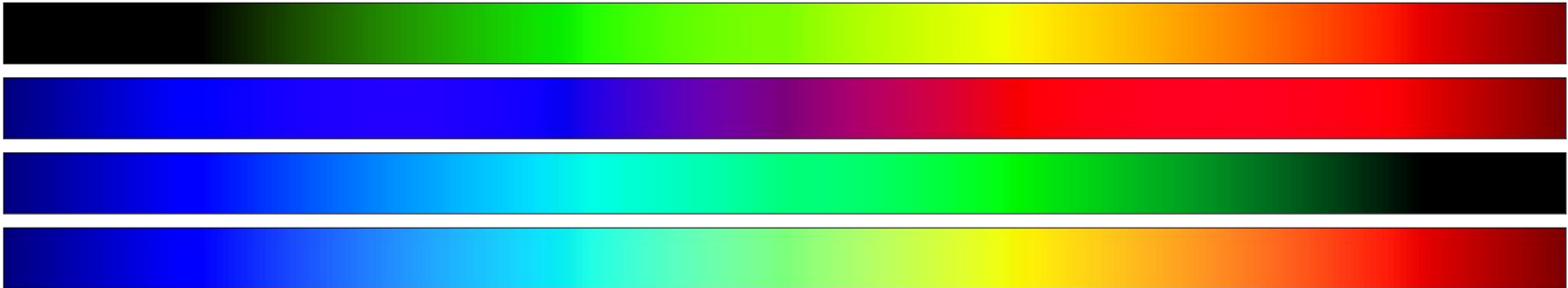
Standard No RedNo GreenNo Blue



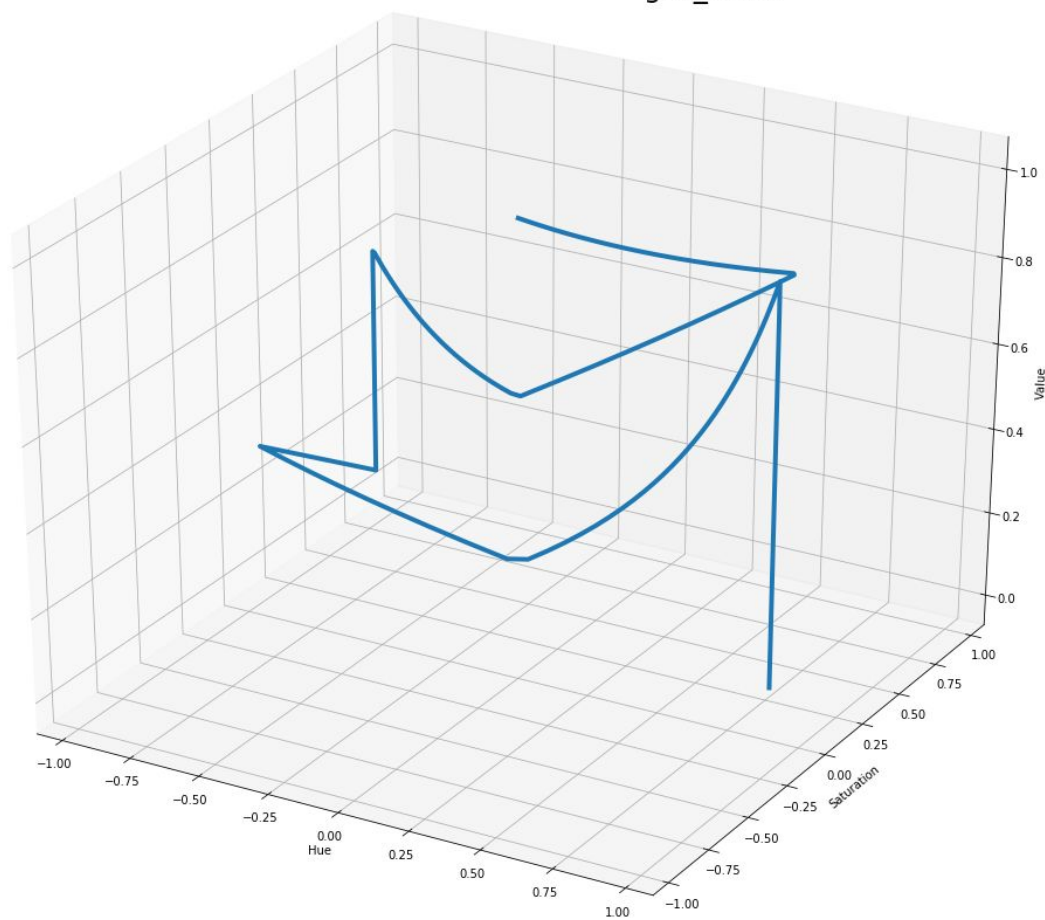
jet



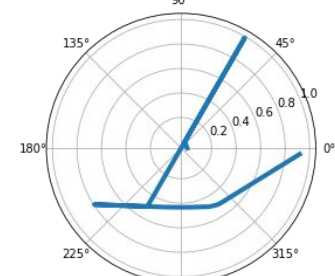
Standard No RedNo GreenNo Blue



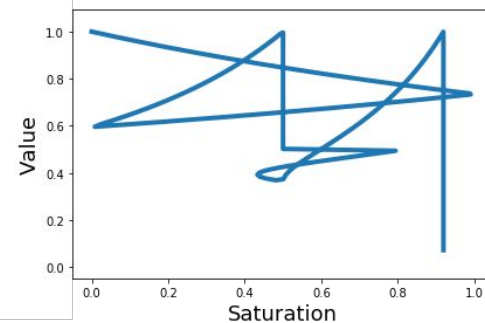
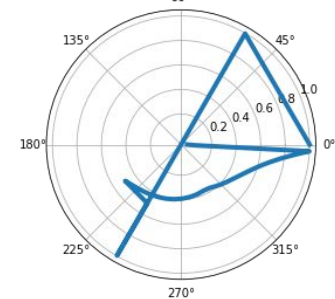
gist_stern



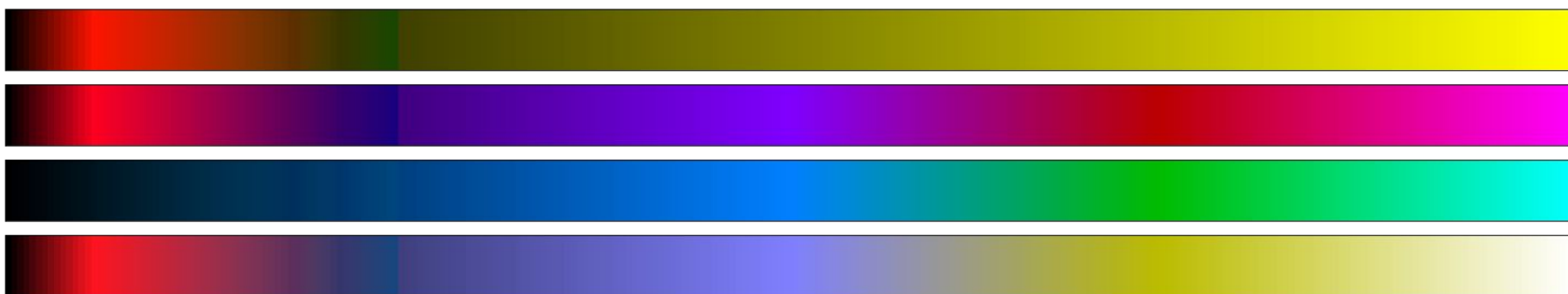
Saturation

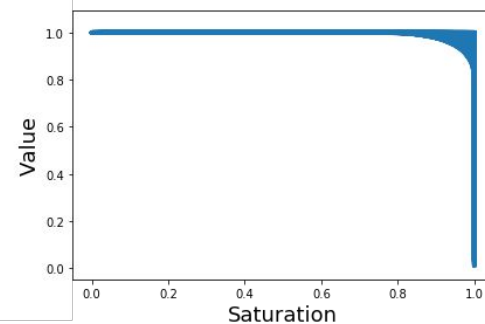
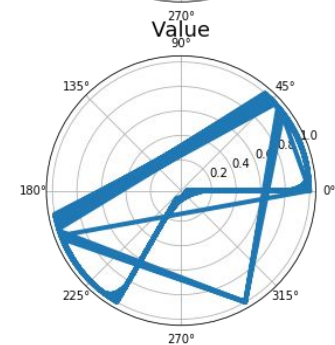
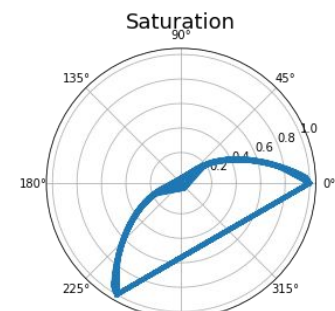
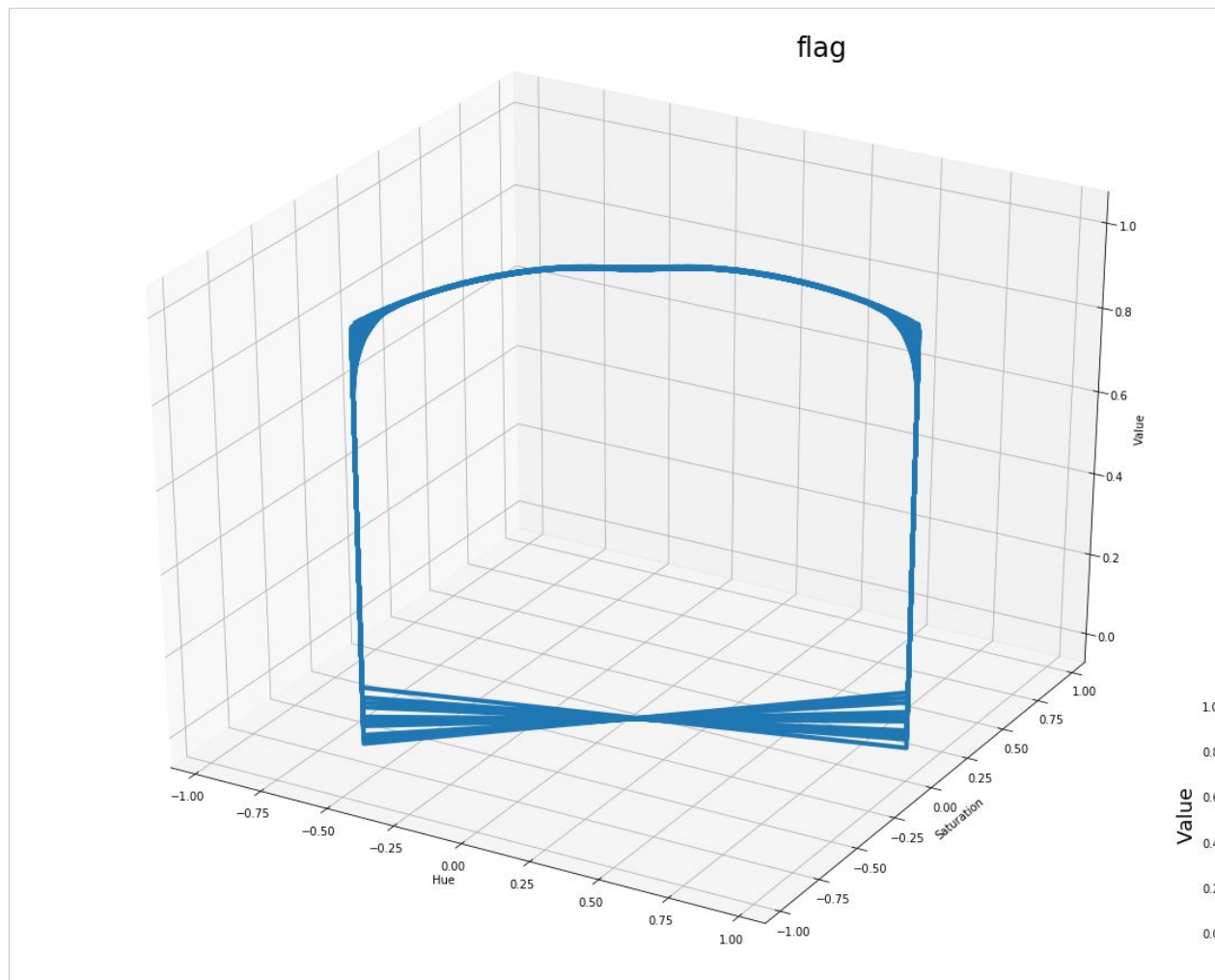


Value

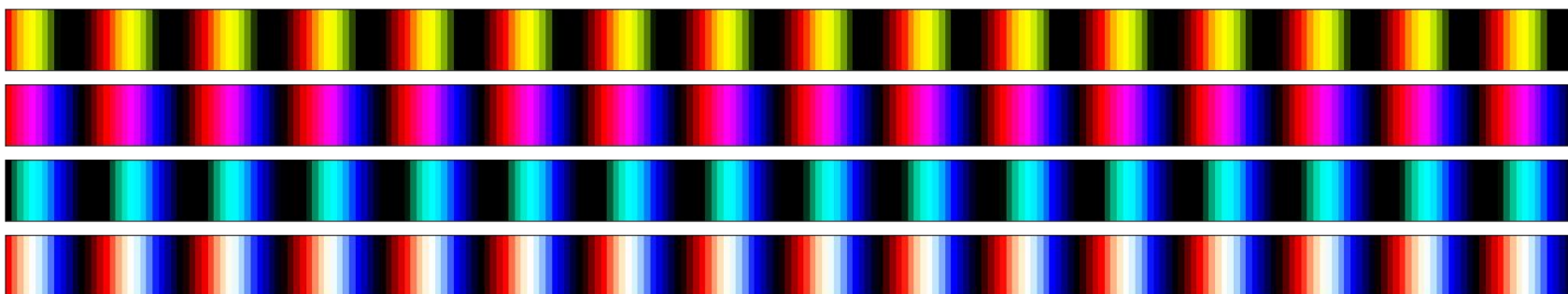


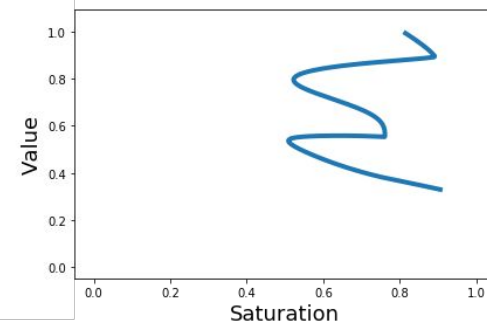
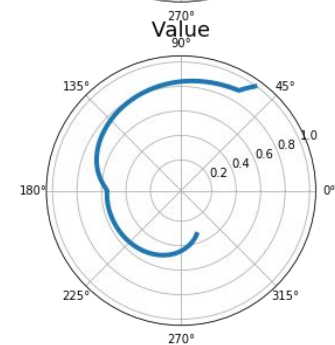
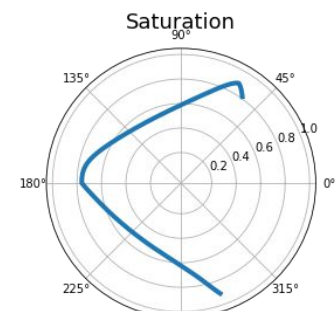
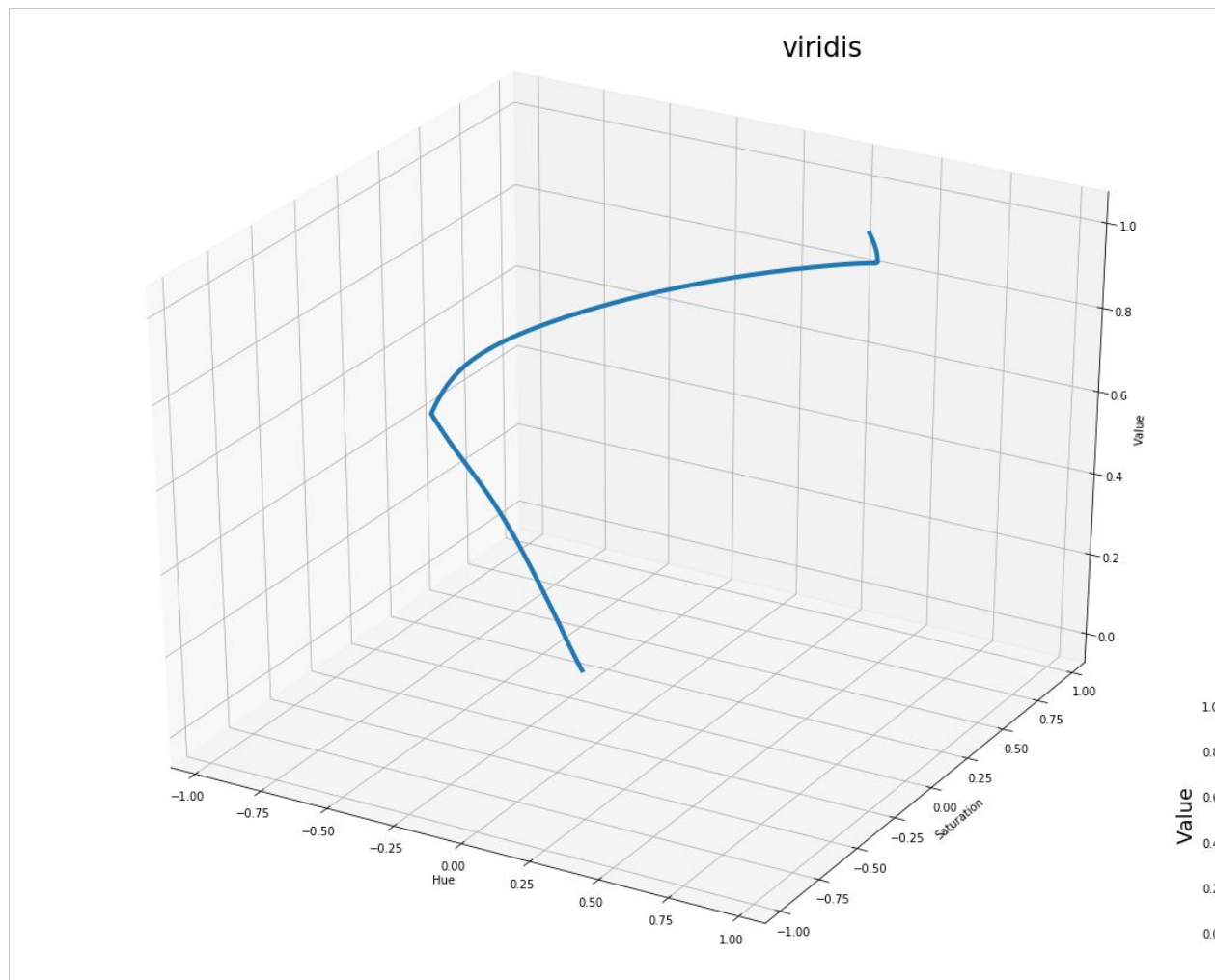
Standard No RedNo GreenNo Blue



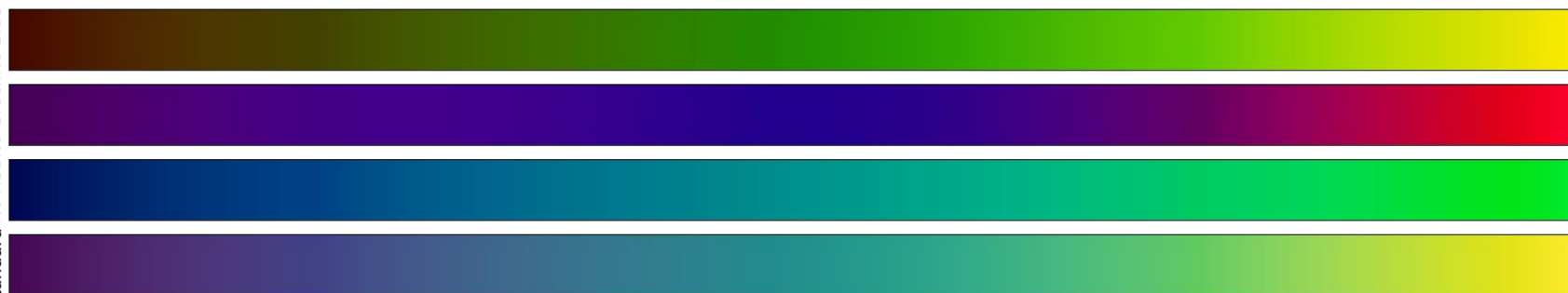


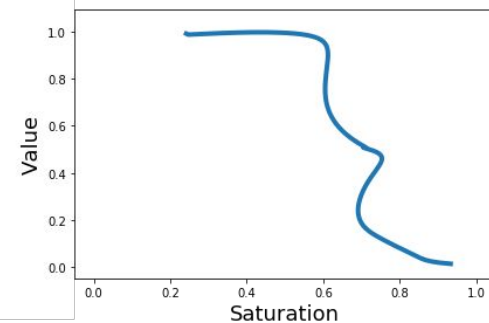
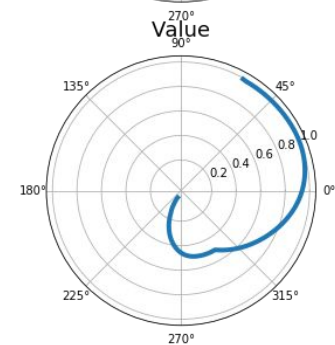
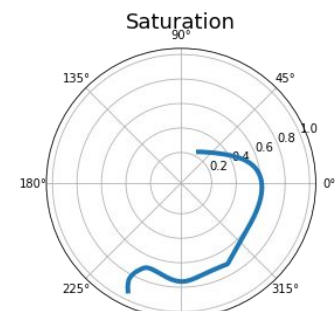
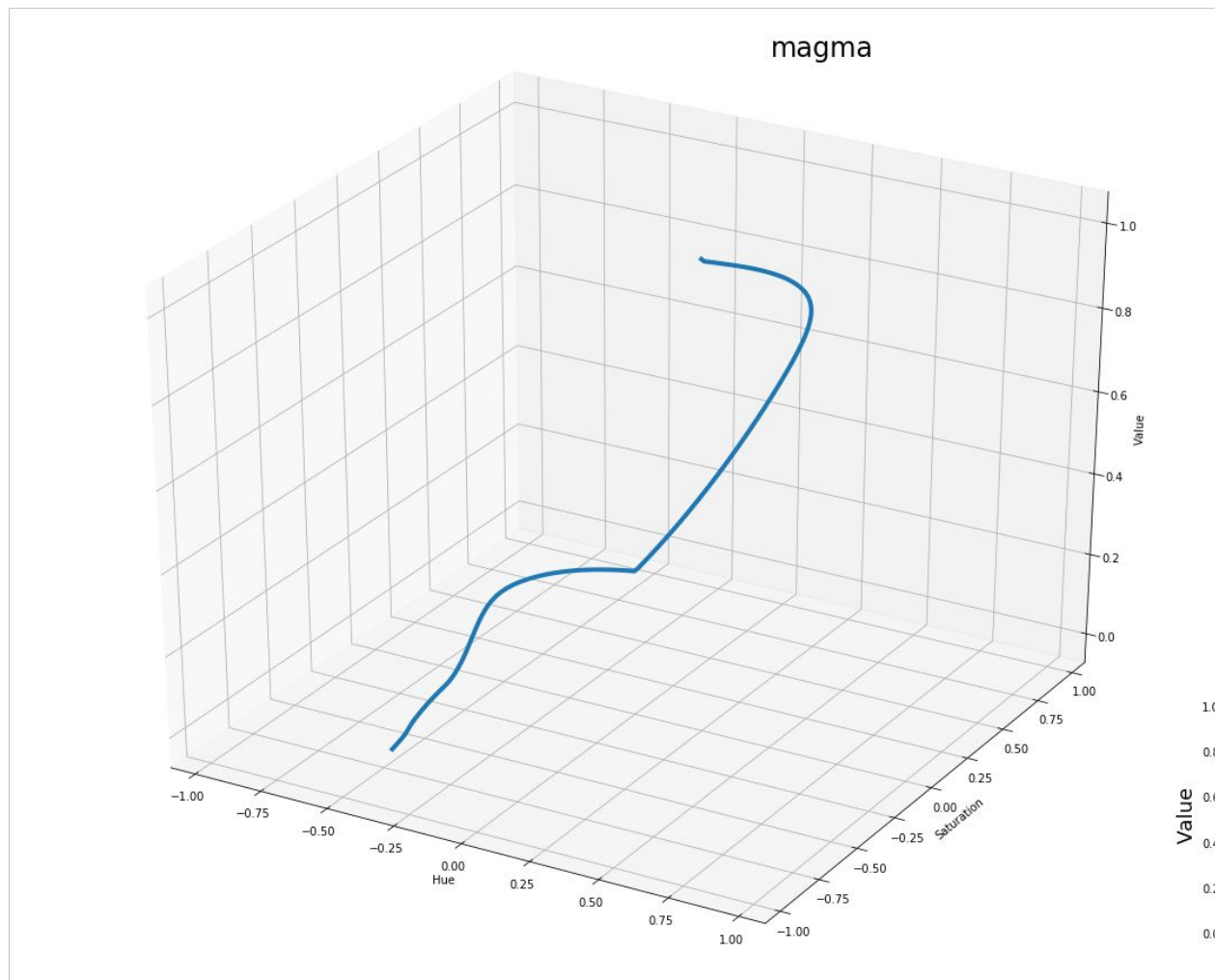
Standard No RedNo GreenNo Blue





Standard No RedNo GreenNo Blue





Standard No RedNo GreenNo Blue



Modules and Scripts

- Reusability
- Execution

the humble import statement

- The “import” statement loads and makes accessible
- Python will search paths to find the script to import
 - `sys.path` is a list of these
 - Current directory may or may not be included
- Modules are reusable collections of functions and scripts
 - The presence of an `__init__.py` file indicates something is a package
 - We will be building a module