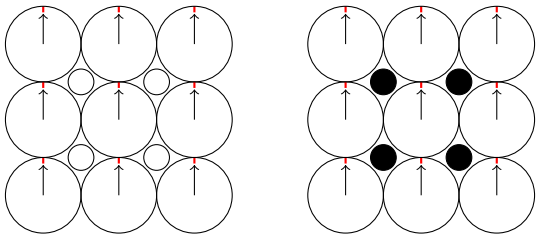
Clock theory

bpaul

October 26, 2025

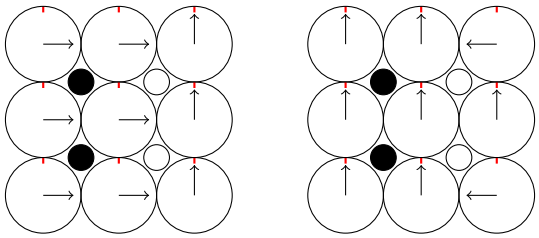
1 Introduction

This is a render of a Rubik's clock.



It consists of 18 "hands", 9 on each side, and 4 "pins". Each pin is "up" on exactly one side, and down on the other side. Dials on the top left, top right, bottom left and bottom right corners of the clock can be turned in order to rotate some of the hands. Which hands are rotated depends on which pins are up or down. Specifically, on the side that the pin adjacent to the dial turned is up, all hands touching a pin that is up will be rotated, and on the other side, only the "corner" pieces will rotate. Rotations occur in one twelfth increments.

For example, here is what occurs if we push the two left pins up, and turn the top left dial three times.



We can see that all six of the hands touching the pins on the front side rotate by three, and on the back side only the two corners that were touching the down pins rotate. Note that the back face is reached by doing a "y2 flip" (where we flip the clock along the vertical axis), which is why the pins on the back face may appear backwards.

This puzzle has many useful properties that makes its theory quite simple (relative to other Rubik's puzzles or other twisty puzzles). The goal of this document is to explain this theory to a general audience, regardless of your background in mathematics.

Contents

2 Modular arithmetic