All About Spirograps

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Introduction to Spirographs

The spirograph equation for three of more wheels can be generalized as follows:

$$z(t) = \sum_{k=1}^{n} a_k e^{i2\pi(n_k t + \theta_k)}$$

This program solves those equations for three wheels, assuming all of the a coefficients are 1 and θ coefficients are 0. Find more details online at http://linuxgazette.net/133/luana.html.

The `spiro()` function in R

The R code for a 3-wheeled Spirograph

This is how to create a 3-wheeled spirograph giving `n1`, `n2`, and `n3`.

```r
library(tibble)

spiro <- function(n1,n2,n3) {
  t <- seq(0,1,length.out=1000)
  z <- exp(1i*2*pi*n1*t) + exp(1i*2*pi*n2*t) + exp(1i*2*pi*n3*t)
  result <- tibble(x=Re(z),y=Im(z))
  return (result)
}

result <- spiro(13,-7,-3)
result
```

```
# A tibble: 1,000 x 2
       x      y
   <dbl>  <dbl>
 1  3      0
 2  3.00 0.0188
 3  2.98 0.0371
 4  2.96 0.0546
 5  2.93 0.0707
 6  2.89 0.0850
 7  2.84 0.0971
 8  2.78 0.107
 9  2.72 0.113
10  2.65 0.116
# ... with 990 more rows
# i Use `print(n = ...)` to see more rows
```

Plot the Spirograph