Reproducibility Guide for Prime Resonance on Spiral Curvature

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Last updated: July 2025

Included Files

- spiral_model.py: Spiral coordinate transformation & curvature function
- run_experiment.py: Main experiment loop for checking resonance
- visualize.py: (optional) To visualize the prime distribution
- README.txt or README.md: This instruction file
- resonance_data.csv: Output of predicted primes & actual results

Environment Requirements

- Python 3.8+
- Required packages:

  pip install numpy sympy matplotlib

Core Formula

Curvature Function:

$c(n) = 18.69 / n + 0.172$

Spiral Coordinates:

$x(n) = \cos(c(n) * n + q(n))$

$y(n) = \sin(c(n) * n + q(n))$

Phase Function per Spiral Region:

Spiral	Range (n)	Phase Function

1 | 1 - 130,715 | q(n) = +0.15 * n

2 | 130,720 - 600,000 | q(n) = -pi * n / 21

3 | 600,001 - 670,000 | q(n) = +2pi * n / 21

4 | 670,001 - 805,000 | q(n) = -2pi * n / 21

5 | 805,001 - 830,000 | q(n) = +4pi * n / 21

6 | 830,001 - (expanding...) | q(n) = -4pi * n / 21

Reproducibility Checklist (MUST FOLLOW)

Step | Item | Description

-----|------|----------

1 | Use correct phase function | Refer to the range above

2 | Use only primes for validation | Use sympy.isprime()

3 | Check Euclidean tolerance | (x, y) must lie within the ring

4 | Do NOT classify all numbers as primes | False accuracy

5 | Use consistent curvature function | Same for all spirals

6 | Output hits only if prime & inside spiral region

How to Run the Experiment

python run_experiment.py

Edit run_experiment.py to adjust start_n, end_n and q(n)

Common Mistakes to Avoid

- Counting all n as primes

- Using incorrect q(n)

- Skipping recalculation of coordinates

- Ignoring float precision

- Not using curvature function

Output & Validation

Example:

Range: 805,001 - 830,000

Total Primes: 1,923

Resonance Hits: 1,923

Accuracy: 100.0%

Language Support

- Korean & English explanations

- Visuals optional

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- Cite as:

Cho, Hye Hyeong. (2025). Prime Number Resonance on Spiral Curvature. OSF. https://osf.io/xxxxx/