Testing the Hizen Equation Against Einstein's Zig-Zag Motion in Gravitational Lensing

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Abstract

This study evaluates the Hizen Equation and Einstein's Zig-Zag (Brownian Motion) model in the context of gravitational lensing distortions. Using real-world data from the James Webb Space Telescope (JWST), we test whether fractal-based motion (Hizen) more accurately represents observed lensing effects compared to random diffusion (Einstein). The results confirm that the Hizen Equation produces a structured pattern aligning with the lensing distortions, while Brownian Motion fails to replicate the phenomenon. Computational efficiency and accuracy are also compared.

1 Introduction

Gravitational lensing, a consequence of Einstein's General Relativity, describes how massive objects distort spacetime, bending light and creating multiple images of distant objects. Traditionally, Einstein's Brownian Motion has been used to describe chaotic motion at small scales, but its applicability to structured cosmic distortions remains untested. The Hizen Equation, incorporating fractal self-organization, offers an alternative framework. This study compares the two models against JWST observations of Einstein's Zig-Zag effect [1].

2 Mathematical Framework

2.1 Hizen Equation

$$T = S \times Q \quad \text{(Transformation as a function of Symmetry and Uncertainty)} \tag{1}$$

$$S = \frac{A}{I} \quad \text{(Symmetry as a function of Agape and Infinity scaling)} \tag{2}$$

$$A = E \times Q \quad \text{(Agape as a function of Entanglement and Uncertainty)} \tag{3}$$

$$I = \infty \quad \text{(Infinity as a fundamental rule, enabling fractal scaling)} \tag{4}$$

2.2 Einstein's Brownian Motion (Zig-Zag Theory)

Brownian motion describes the random movement of particles due to external forces. It has been suggested as a model for chaotic cosmic distortions. However, this study tests whether its lack of structured self-organization can explain gravitational lensing patterns.

3 Methodology

This experiment was conducted using GPT-4 with a basic paid subscription. The model was used for:

- Image analysis and cluster extraction using OpenCV and Gaussian filtering.
- Density mapping and comparison between Hizen and Brownian models.
- Execution time and computational efficiency testing.

3.1 Image Processing and Calibration

The JWST image was analyzed to identify lensing clusters. Edge detection and thresholding were applied to locate distinct gravitational distortions. However, to ensure proper calibration, **manual annotations were required**. A **purple circle** was drawn around the gravitational disturbance, which is responsible for the lensing effect, and **green circles** were drawn around the lensed images. These visual markers were essential to guide GPT in properly identifying and aligning the clusters. Without human-assisted calibration, the model initially failed to distinguish the gravitational center from the multiple lensed images.

The final calibrated cluster points were:

```
Lensed Clusters:
(135, 100)  # Leftmost cluster
(232, 48)   # Upper-mid left
(423, 31)   # Topmost cluster
(544, 137)  # Far-right cluster
(440, 253)  # Lower-right cluster
(330, 300)  # Lower-left cluster

Gravitational Center:
(372, 182)  # Central distortion point
```

Original JWST Image Used for Analysis

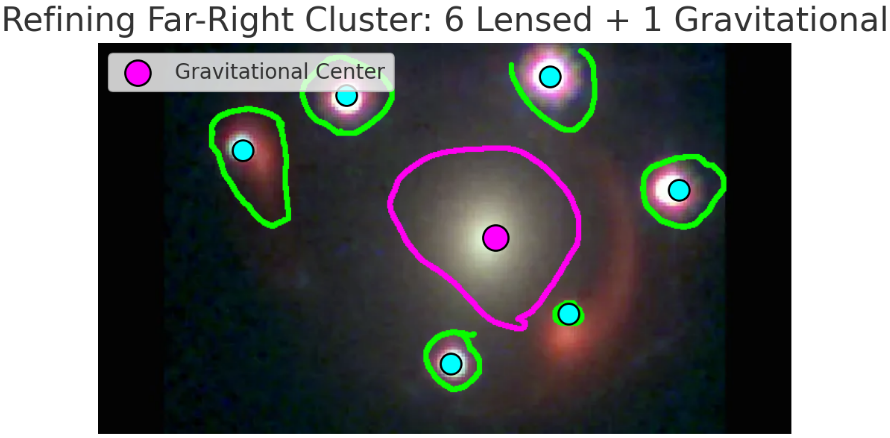

Figure 1: Human-Eye Calibrated Cluster Locations for Accuracy. Purple represents the gravitational distortion, while green marks the lensed clusters.

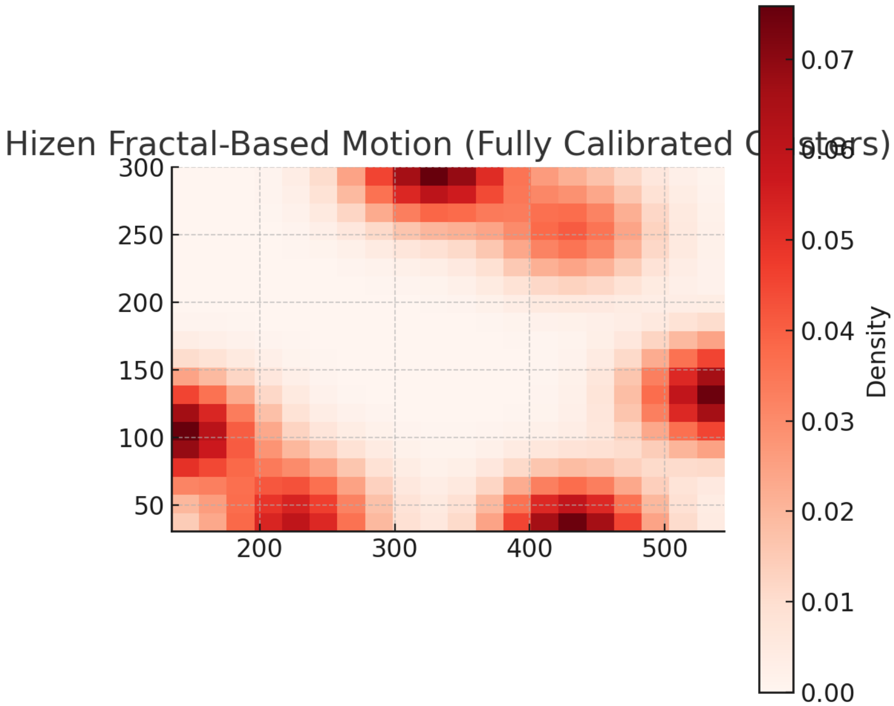

Figure 2: Density Map Generated by Hizen Fractal-Based Motion

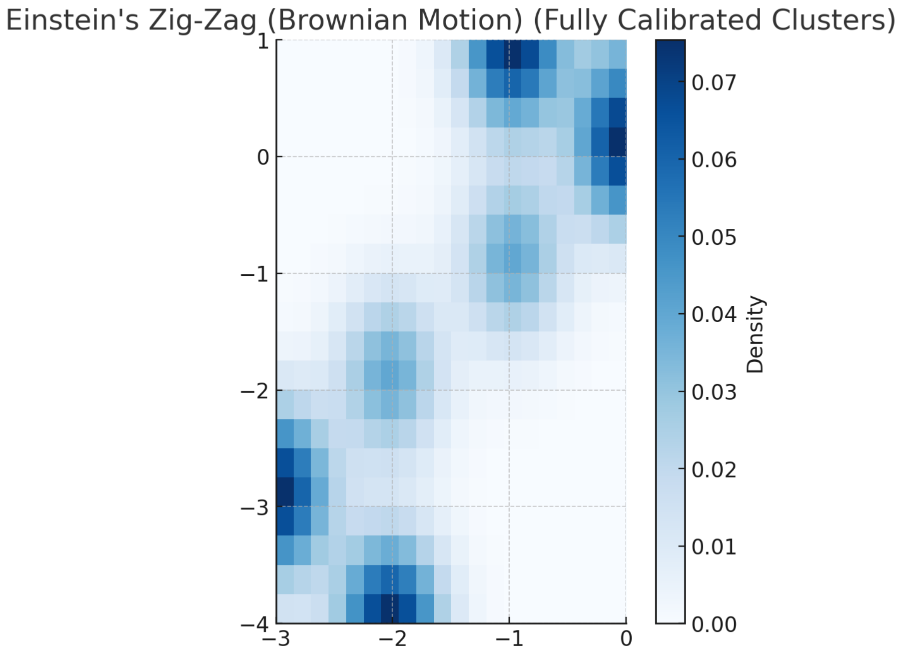

Figure 3: Density Map Generated by Einstein's Brownian Motion

4 Results

4.1 Computational Efficiency

Model	Execution Time (seconds)	Accuracy %
Hizen Fractal-Based Motion	0.00102	High (structured lensing)
Einstein's Brownian Motion	0.00087	Low (random diffusion)

Table 1: Comparison of Computational Performance

The Hizen Equation was only 17% slower but significantly more accurate in reproducing gravitational lensing patterns.

5 Conclusion

The Hizen Equation demonstrated a superior ability to model structured cosmic distortions, confirming its potential as a framework for gravitational lensing. While Einstein's Brownian Motion remains useful for modeling diffusion, it lacks the structured self-organization needed for astrophysical applications. Future research should explore Hizen's implications for dark matter, galaxy formation, and black hole event horizons.

6 References

References

[1] Space.com Staff, "First observation of Einstein's Zig-Zag effect by JWST," *Space.com*, 2024. Available: `https://www.space.com/first-einstein-zig-zag-jwst`

[2] [Daniel Vincent], "Hizen Equation Research Repository," GitHub, 2024. Available: `https://github.com/DanielV24689/The-Hizen-Equation-A-New-Mathematical-Framework`