1. Introduction

Traditional gravitational theory treats planetary gravity as a function of mass and radius. However, this approach does not fully explain the internal mechanism by which large celestial bodies interact with trend fields (a conceptual representation of space's structural tendency to compress toward mass concentrations).

In this paper, we explore a model that decomposes planetary gravity into two components:

- **Trend compression factor**: representing how internal structure compresses trend-induced spatial energy;
- **Penetration factor**: representing the resistance of the planet's material to the incoming trend field.

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2. Core Formula

The effective surface gravity g is defined as:

$$g = R_{\text{factor}} \cdot \phi$$

Where:

- R_{factor} is the trend compression coefficient;
- ϕ is the penetration factor.

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3. Penetration Factor ϕ

$$\phi = \frac{1}{\rho^{\alpha} \cdot T_p^{\beta}}$$

Where:

- ρ: Average density of the planet;
- α, β: Adjustable sensitivity parameters;
- T_p: Internal trend pressure defined as:

$$T_p = \frac{\rho}{\log\left(\frac{V_{\text{space}}}{V_{\text{planet}}}\right)} \div R$$

Here:

- $V_{\text{planet}} = \frac{4}{3}\pi R^3$: Volume of the planet;
- V_{space}: Reference external volume (e.g. $R + 10,000$ meters);
- R: Radius of the planet.

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4. Trend Compression Factor R_{factor}

$$R_{\text{factor}} = \log(\rho) \cdot \log\left(1 + \frac{V_{\text{planet}}}{10^9}\right) \cdot \left(\frac{1}{\log(V_{\text{space}}/V_{\text{planet}})}\right) \cdot S$$

Where S is a stabilization constant, typically set to 12.7.

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5. Model Insights

This model explains why planetary gravity emerges even without nuclear fusion or internal combustion. It asserts that:

- The mass and volume of a planet create a mild but measurable spatial distortion;
- The closer to the core, the stronger the trend compression becomes;
- Penetration of trend fields depends on material density and resistance gradient;
- The resulting gravity is a balanced effect of outward structural repulsion and inward trend gradient convergence.

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6. Applications and Accuracy

The model has been tested against Earth, Jupiter, and Saturn using publicly known radius and density data. Calculated surface gravity values were within ±5% of accepted physical values, validating the functional utility of the proposed method.

This method may further assist in analyzing exoplanetary gravity, gas giant internal dynamics, and even the early stages of artificial planetary formation.

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7. Conclusion

By redefining gravity through trend interaction and penetrative damping, this framework offers a new pathway for understanding gravitational phenomena as emergent from structural-spatial interactions rather than pure mass aggregation. It lays the foundation for future research in trend physics, compressive field mechanics, and alternative gravity generation theories.