2.4 Foundational Criteria for Dimensions

The inclusion of Zero (ζ), Infinity (ω), and Chance (ξ) as fundamental dimensions satisfies key criteria outlined in Section 3.1.

1. Necessity

These dimensions are indispensable for explaining observed physical phenomena:

- Zero (ζ) prevents singularities, defining the lower boundary of physical existence.
- Infinity (ω) sets the unbounded limit of expansion, allowing for cosmic scalability.
- Chance (ξ) governs vacuum energy fluctuations and quantum randomness, driving spontaneous energy events in space.[5], [12]

2. Subordination

These dimensions interact dynamically within the broader spacetime framework:

- Zero and Infinity establish fundamental constraints, shaping the limits of existence.
- Chance operates probabilistically within these limits, governing quantum and thermodynamic fluctuations.[12], [13]
- 3. Mathematical & Physical Manifestation

Each dimension has explicit mathematical and observable consequences:

- Einstein's field equations (Section 3.3) incorporate ζ , ω , and ξ , modifying gravitational curvature.
- The Schrödinger equation (Section 4.1) includes Chance (ξ), introducing probabilistic quantum corrections.[13]
- Vacuum energy models must include Chance (ξ), as it dictates spontaneous fluctuations.[12]

These modifications ensure that zero, infinity, and chance are not abstract concepts but rigorous, testable components of physical law.