PROVISIONAL PATENT APPLICATION

Geometric Six-Base Structural System for Modular and Scalable Space Architecture

FIELD OF THE INVENTION

This invention relates to modular structural design and assembly, particularly in the field of large-scale space architecture, where geometric precision and scalability are required. Specifically, it introduces a six-base integer-coordinate system for defining, placing, and assembling structural components with self-aligning properties.

BACKGROUND

Large structures in outer space, such as space stations, habitats, and orbital frameworks, require a systematic approach to placement and assembly. Traditional Cartesian coordinate systems introduce complexity in defining modular components. This invention provides a novel integer-based six-base coordinate system that ensures geometric precision, self-aligning assembly, and scalability while reducing computational and material inefficiencies.

SUMMARY OF THE INVENTION

The invention introduces a six-base integer coordinate system designed to place modular triangular components within a stable, self-aligning framework. The method defines:

- Six orthogonal basis planes (X, Y, Z, U, V, W) for structuring component placements.
- Integer-based addressing, ensuring modular component placement at discrete lattice points.
- Edge-based joining system, maintaining structural integrity without vertex dependency.
- Recursive expansion principles, enabling self-replicating and scalable architectures.
- Applications for autonomous robotic assembly in self-assembling space infrastructure.
- Unit and Golden Ratio Placement Methodology for precise modular positioning.
- Rotation-based alignment of Fibonacci geometry using U, V, W basis transformations.
- Modular triangular components aligned with classical Greek geometry, specifically 36 degrees-36 degrees-108 degrees Golden Triangles and 72 degrees-72 degrees-36 degrees Golden Gnomons.

FIG. 1 - Rotation Vectors in Six-Base System

Figure 1 illustrates the six-base coordinate system with U, V, and W basis transformations. These rotations allow alignment with Fibonacci spatial structures, ensuring modular growth and self-aligning assembly.

FIG. 2 - Parabolic Mirror Support Structure with Six-Base Coordinates

Figure 2 demonstrates the application of six-base integer coordinates in a parabolic mirror support structure. The unit-distance and Golden Ratio placements allow for precise modular expansion, ideal for space applications.

FIG. 3 - Triangular Support Structure for Modular Assembly

Figure 3 showcases the triangular structural framework underpinning modular assembly. The design adheres to edge-joining principles, ensuring strength and flexibility in large-scale geometric architectures.

CLAIMS

1. A six-base integer coordinate system for modular space structures.
2. A method for structuring self-aligning modular assemblies using edge-based connections.
3. A recursive expansion method allowing infinite geometric growth while maintaining structural stability.
4. A robotic assembly algorithm based on integer-coordinate placement.
5. A vibrational and resonance-tuned structure for mitigating microgravity-induced oscillations.
6. A placement algorithm integrating unit-distance and Golden Ratio movements for optimized self-assembling architectures.

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