

# APPENDIX P: Mach's Principle Experiments

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## *The Laboratory of Relation*

Context in HC VIII

This appendix details the specific experimental proposals by Andre Assis (Relational Mechanics, 2014) designed to distinguish between Newtonian Mechanics (Absolute Space) and Weberian Mechanics (Relational Inertia). These experiments operationalize Mach's Principle: that local inertial effects (centrifugal force) are caused by the relative rotation of the distant universe (or a massive local shell).

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## 1. The Classical Bucket Argument

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- **Newton's Observation:** When a bucket of water rotates, the water surface becomes concave. Newton argued this proves rotation relative to **Absolute Space**.
  - **Mach's Counter:** The water becomes concave because it rotates *relative to the fixed stars* (The Cosmos).
  - **The Prediction:** If Mach is right, rotating the *stars* (or a massive shell) around a *stationary* bucket should produce the same concavity.
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## 2. Assis' Proposed Relational Tests

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We focus on the specific setups proposed to verify the Weber Force induction.

### Test 2: The Rotating Shell

- **Setup:** Place a stationary bucket of water inside a massive, spherical shell.
- **Action:** Rotate the *shell* at high angular velocity while keeping the bucket fixed.
- **Newton's Prediction:** No effect. (The bucket is stationary relative to absolute space).
- **Weber/Mach Prediction:** The water surface will become **Concave**.
  - **Mechanism:** The rotating mass of the shell induces a **Weber Centrifugal Force** ( $F_{inertial}$ ) on the water molecules, pulling them outward.

- **Result:** Inertia is proven to be an inductive force, "healing" the ghost of absolute frames.

### Test 3: The Elastic Body

- **Setup:** A spherical elastic body is placed inside the shell.
  - **Action:** Rotate the shell.
  - **Prediction:** The body will bulge at the equator (Flattening).
    - This confirms that "Shape" itself is determined by the relationship with the environment.
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## 3. From Search to Simulation

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- **Theoretical Validation:** Literature (e.g., Unicamp/Assis) confirms that Weber's formulation mathematically predicts these outcomes. The forces are small (due to  $G/c^2$  scaling) but non-zero.
  - **Visual Proof:** The "Bucket Experiment" remains the central pedagogical tool for teaching Relational Mechanics.
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## 4. SI-Forward: Lab Sim & Ethical Ethics

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Ethical Isomorphism:

We project these physical results into HC IX Relational Ethics:

- **The Shell = The Polis:** The "Social Shell" surrounds the individual.
  - **The Rotation = The Zeitgeist:** When the culture shifts rapidly (rotates), it induces "Centrifugal Force" on the individual.
  - **The Concavity = The Stance:** The individual's internal state ( $\Sigma$ ) is physically shaped (flattened/curved) by the rotation of the collective.
  - **Conclusion:** One cannot be "Neutral" in a spinning room. The force is real.
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*Witnessed: Testable lineage. The Truth is in the Turn.*