Transcomputation

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Agenda

- Newton's (modified) Laws of Motion
- Modelling a see-saw
- Modelling a black hole

Laws of motion

Nullity force

- There is no component of nullity on the extended-real number-line so nullity forces have no, i.e. zero, effect on the extended-real universe where we live

Newton’s Law 1

- A mass is accelerated only by a positive or negative force, not a zero or nullity force

Newton's Law 2

- $F = ma$ when $0 < m < \infty$ and a is transreal
- $a = F / m$ when $0 < m < \infty$ and F is transreal
- $m = F / a$ when a, F are transreal. When the computed mass is real, it is determined. When the computed mass is nullity, the true, finite mass, is hidden (but can be discovered via gravitation)

Newton’s Law 3

- To any action, F, there is always an opposite and equal reaction, -F

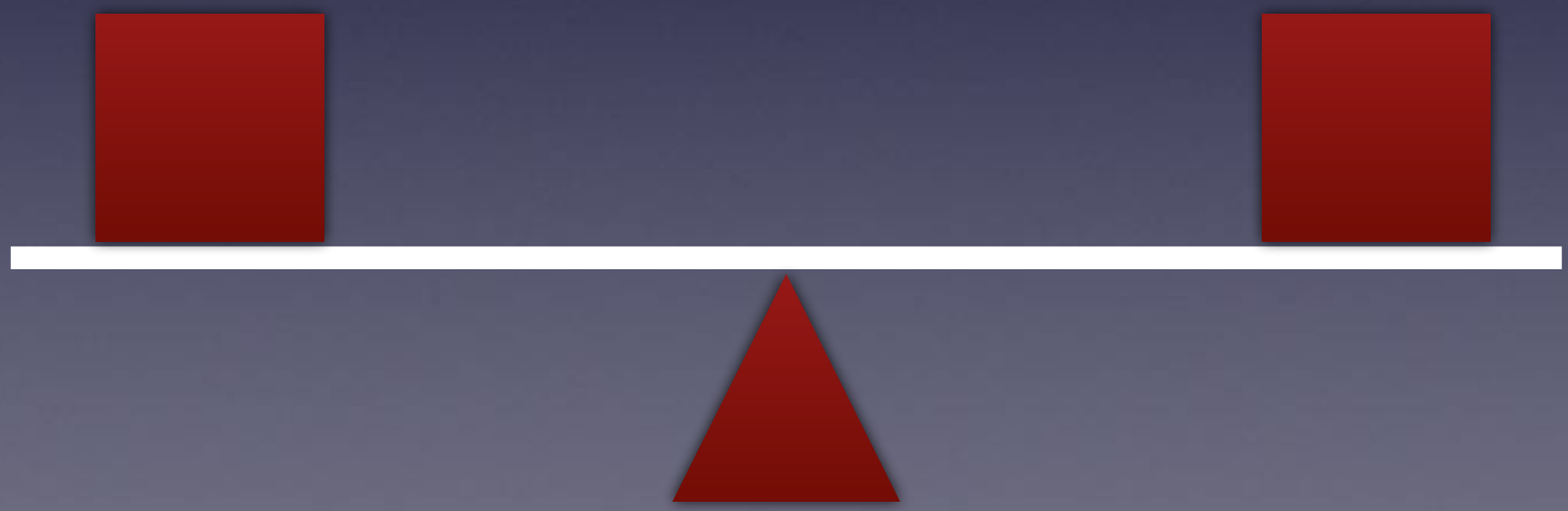
Modelling see-saw

Information

- Real numbers have more information than infinite numbers
- Infinite numbers have more information than nullity
- Hypothesis: physical systems always adopt the transreal configuration with the highest possible information

See-saw

$m_1 d_1 \longleftrightarrow m_2 d_2$



Puzzle

- When is the see-saw balanced?
- When is it balanced with one weight?
- When is it balanced with two weights?
- When is it balanced with three weights?

Puzzle

- Is the transreal equation $m_1 d_1 = m_2 d_2$ itself a model?
- Do we need to model the fact that nullity forces project into the extended-real universe as zero forces?
- Can we do physical experiments to constrain the model?

Modelling black-hole

Black hole

- Suppose we have two, same charged, massive particles at the singularity of a black hole

- Attraction $F_g = G\frac{m_1 m_2}{r^2} = G\frac{m_1 m_2}{0^2} = \infty$

- Repulsion $F_e = k_e\frac{q_1 q_2}{r^2} = k_e\frac{q_1 q_2}{0^2} = -\infty$

- Nett force $F = F_g + F_e = \infty - \infty = \Phi$

Black hole

- The particles are bound by a nullity force at the singularity so are free to move but are not compelled to move
- A quantal fluctuation in position may move some effective mass away from the singularity - if it inflates, it may leave the event horizon, if not it falls back into the singularity in a convection current

Black hole

- The convection current perturbs the event horizon:
- Evaporation is faster than predicted by Hawking because a bumpy and roiling event horizon has a larger surface area than a spherical one
- Heating outside the event horizon is non-monotonic because a bumpy and roiling event horizon accelerates local particles differentially

Puzzle

- What experiments or observations can we do to constrain the model?
- What theoretical work can we do to constrain the model?

Reading

- Trans-Newtonian Physics

Conclusion

- Transreal and transcomplex arithmetic are total and consistent
- We may use transarithmetics in a model
- Newton's modified Laws of Motion can hide the physical mass in the computed mass of nullity but the physical mass can always be recovered via gravitation so there is no loss of information
- We can compute with a model!