



**Decolonizing The Mind (DTM)
a theoretical framework
Part 3 – decolonizing mathematics**



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C.K. Raju (1954 -)



Decolonizing mathematics

- Eurocentric mathematics: built on phantasies: axioms
- Decolonial mathematics: built on empirical proof

Metaphysics: create fantasies

C.K. Raju: *“Empirical proof is rejected by Western mathematics on the grounds that empirical proof is fallible. Our senses might mislead us. To use a classical example from Indian philosophy: I might mistake a rope for a snake or a snake for a rope, but we never mistake a snake for an elephant.”*

Decolonizing mathematics

1. Critique of methods of Eurocentric math: formal mathematics
2. Reappraisal of non-western math
3. Rewriting the history of math
4. Reverse engineering
5. Social dimension of math

Critique of formal mathematics

1. Moving away from empirical proof to axioms and definitions creates phantasies that goes against empirical evidence
2. Formal mathematics leads to invalid knowledge: fallacies
3. Formal mathematics comes simple matters complex

Shrinivasa Ramanujan (1887-1920)



1.1 Phantasies against empirical evidence



Why does this go against empirical evidence?



1.2 Formal mathematics leads to invalid knowledge: fallacies

1. Let a and b be equal, non-zero quantities
 $a = b$
2. Multiply by a
 $a^2 = ab$
3. Subtract b^2
 $a^2 - b^2 = ab - b^2$
4. Factor both sides: the left factors as a difference of squares
 $(a - b)(a + b) = b(a - b)$
5. Divide out $(a - b)$
 $a + b = b$
6. Observing that $a = b$
 $b + b = b$
7. Combine like terms on the left
 $2b = b$
8. Divide by the non-zero b
 $2 = 1$

1.3 Formal mathematics comes simple matters complex

If you reject empirical proof
why is $1+1=2$?

Giuseppe Peano (1858-1932) and Bertrand Russell (1872-1970) and his co-writer Alfred Whitehead (1861-1947)

Creating the fantasy

- Axioms
- Definition
- Two-value logic: truth or false

Authority of formal mathematics

*54.43. $\vdash : a, b \in 1, \supset : a \cap b = \Lambda, \equiv : a \vee b \in 2$

Dem.

$\vdash : *54.26, \supset \vdash : a = t'x, b = t'y, \supset : a \vee b \in 2, \equiv : x \neq y.$

[*51.231] $\equiv : t'x \cap t'y = \Lambda.$

[*13.12] $\equiv : a \cap b = \Lambda$ (1)

$\vdash (1), *11.11.35, \supset$

$\vdash : (x, y), a = t'x, b = t'y, \supset : a \vee b \in 2, \equiv : a \cap b = \Lambda$ (2)

$\vdash (2), *11.54, *52.1, \supset \vdash$. Prop

From this proposition it will follow, when arithmetical addition has been defined, that $1 + 1 = 2$.

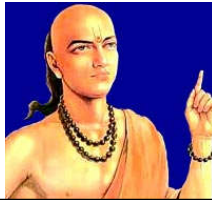
Framing, logic and cheating

1 2 3 4 5 6 7 8 9

1 3 2 4 5 7 6 9 8

2. Reappraisal of non-western math

- Chinese math: algebra
- Indian math: calculation square roots (construction) (p. 6)



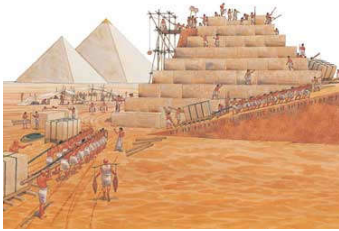
Aryabhata (476-550)

3. Rewriting the history of math

- “Multicultural math”: contributions of other civilizations, Greeks learned math from Africans
- Change the name of Pythagoras theorem: the first price for the second to come in

4. Reverse engineering

How to build a pyramid without formal math?



5. Social dimension of math: $2-1=??$



Conclusion

- Eurocentrism has produced a new form of math (formal math) that produces invalid knowledge
- Eurocentrism prevents better math

Questions and discussion

