

Abel Prize 2004 for Index Theory

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Plan

- (1) Why no Nobel Prize in Mathematics?
- (2) Niels Henrik Abel and the Abel Prize
- (3) The Last 50 Years of Mathematics
- (4) Form, Change, and Coding
- (5) The Local-Global Mystery
- (6) References

Why no Nobel Prize in Mathematics?

Since 1901, there are Nobel prizes in

- Chemistry
- Literature
- Peace
- Physics
- Physiology and medicine
- Economy (added in 1969)

No Nobel prize in mathematics!

The most common explanations...

Niels Henrik Abel and the Abel Prize

- Life and importance of Niels Henrik Abel (1802-1829)
- Norwegian state donation of 200 million NKR in 2002
- Abel prize 2003 to Jean Pierre Serre
- Abel prize 2004 to Michael Atiyah and Isadore Singer

The Last 50 Years of Mathematics

- World War II triade
 - Jet propulsion
 - Nuclear energy
 - Computer
- Pure mathematics
 - Continuum Hypothesis
 - Four colours suffice
 - Fermat's Last Theorem
 - Poincaré Conjecture (?)
- Applied mathematics
 - Partial differential equations (meteorology)
 - Communication, sequence analysis
 - Cryptology and compression
- Expansion or consolidation?
 - Physics consolidation by relativity and quantum mechanics (1905-1930)
 - Biology consolidation by genetics and DNA (ca. 1950)
 - Mathematics consolidation by index theory (since 1962)

Form, Change, and Coding

Case Polyeders and Riemann surfaces

- Polyeder
- Riemann surfaces
- Euler's formula
- Hopf's formula

The Local-Global Mystery

- Can you hear the shape of a broken bowl?
- Cutting and pasting of frequencies
- Synthetic Aperture Radar (SAR)
- Magnetic Resonance Imaging (MIR)

References

<http://mmf.ruc.dk/~Booss/>