Alex J. Best BU Math Retreat 2019

1. Thank the audience for being awake.

Mathematicians make mistakes.

The problem

The problem

The problem

At least for a while.

The problem

☐ The problem

└─The problem

Mathematicians make mistakes. Sometimes they publish these mistakes

Sometimes they puties these mistakes. Sometimes nobody notices.

At least for a while...

The problem

However this uncertainty takes up time and energy, what if referees only needed to judge the importance, novelity and quality of exposition, not check the arguments.

Something to Lean on; fun with interactive theorem provers

-Some examples: Grunwald(-Wang) and

K-theory

Some days later I was with Actin in his office when Wang appared. He said he had a counterexample to a limmus which had been used in the proof. An hour or two later, he produced a counterexample to the throrem intell... Of course he fefting was attended, as were all of us students, that a famous throrem with two published proofs, one of which we had all heard in the seminar without our noticing anything, could be wrong.

Some examples: Grunwald(-Wang) and K-theory

The problem: 2, the cursed prime. This is often an edge case.

Something to Lean on; fun with interactive theorem provers

Some examples: Grunwald(-Wang) and

K-theony

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Some examples: Grunwald(-Wang) and K-theory

our noticing anything, could be wrong.

The groundbreaking 1986 paper "Algebraic Cycles and Higher K-theory" by Spencer Bloch was soon after publication found by Andrei Suskin to contain a mistake in the proof of Lemma 1.1. The proof could not be fixed.

— Vosvedsky

The problem: 2, the cursed prime. This is often an edge case.

The new problem

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How do you describe the steps of a proof to a computer with as little pain as possible? Often mathematicians leave unsaid many steps which are intuitive or easily supplied.

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Proof: [left as an exercise] (Hint: Use Binet's formula).

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Proof (effs an encoratio) (files the Reservis formula).

Reverio. Klat.

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Brevit. Klar.

The new problem

[Proof similar to that of #35-31]

The new problem

└─The new problem

The new problem

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[Proof similar to take of 4551]

Proof Obvious.

The new problem

How do you describe the steps of a proof to a computer with an little pain is possible? Other multi-medicate faces ensaid many steps which we attended or only supplied. Proof (Prix as moreisal) (Bint Due Bane's formula). Revite Klat. [Proof militaries to blast of #3541] Proof (Obvious. Proof (Obvious. )

The new problem

Something to Lean on; fun with interactive theorem provers

The new problem

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When day no decide the stage of a paid to a computer with an title pairs an passible! Often multimentations have ensued many tapes which are instituted on early supplied.

Proof the as an enemial (little but Boorfs fromto).

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[Prind dimine to that of 4351]

Prind (Obtions.

Deed if the as an enemial (little days in material bubblepaid Lane)?

Q. E. D.

Proof: Easy, by induction on n.

Something to Lean on; fun with interactive theorem provers

The new problem

lists pain a possible! Often mathematicans have unsued many steps which are institute out possible.

Proof. Filt as a securicy (title the litera's formula).

Bereir. Kitz.

[Proof similar to that of 88:91]

Proof. Offenion.

Proof. In the consecution of the contract of

How do you describe the steps of a proof to a computer with as

stay sane we must strike a balance between detail and verbosity.

The new problem

end

Lean will figure out when and how to apply the lemmas.

2019-04-29 Sol pro

Something to Lean on; fun with interactive theorem provers

factorial (n + 1) = factorial n \* (n+1) := begin -- write out the definition of factorial unfold factorial,

rewrite list range'\_concat 1 n,
-- the product of two sequences joined together is
just the product of the products of each sequence
rewrite list.prod\_append,

rewrite list.prod\_append,
-- I'm bored already are we done here?
simp,

-- YES!

end

lemma fact\_rec (n : N) :

we can replace all of the above with: by unfold factorial; simp [list.range\*\_comcat, list.prod\_append]

Lean will figure out when and how to apply the lemmas.