Fermat + Coq: FLT from a Global Normalization ($o^n = 2 \cdot n$)

We present a *global-normalization* reading of G. L. Dedenko's manuscript. Instead of proving an intermediate divisibility, the argument introduces a **single multiplier** $o > 1$ (independent of n) such that, for any putative counterexample in natural numbers to Fermat's equation

$$x^n + y^n = z^n \qquad (n > 2),$$

one has the *normalization equation*

$$o^n \;=\; 2 \cdot n.$$

This is taken as a hypothesis about any hypothetical solution (a global normalization). From this equality alone, elementary growth comparisons force $o = 2$ and $n \in \{1, 2\}$, hence no solutions exist for $n > 2$.

What is formalized in Coq.

- We keep o abstract and assume only: if $x^n + y^n = z^n$ with $n > 2$, then $o^n = 2 \cdot n$ and $o > 1$.
- Using elementary lemmas about exponential vs. linear growth, Coq proves:

$$o^n = 2 \cdot n \;\&\; o > 1 \implies (o, n) = (2, 1) \text{ or } (2, 2).$$

- Therefore, under the global normalization hypothesis, Fermat's equation has no natural solutions for $n > 2$.
- Parity constraints stemming from the standard parametrization ($z := m^n + p^n$, $x := m^n - p^n$) are proved separately (for completeness) but are *not* needed in the final step.

Motivation vs. proof. The discussion of $f(n) = (2n)^{1/n}$ explains why the multiplier is taken in the n-th power form o^n (homogeneity/"stay in n-th powers"). This motivates the *form* of the normalization but is *not* used inside the proof of the conditional implication.

Repository (code and PDFs): github.com/Gendalf71/FLT-Coq

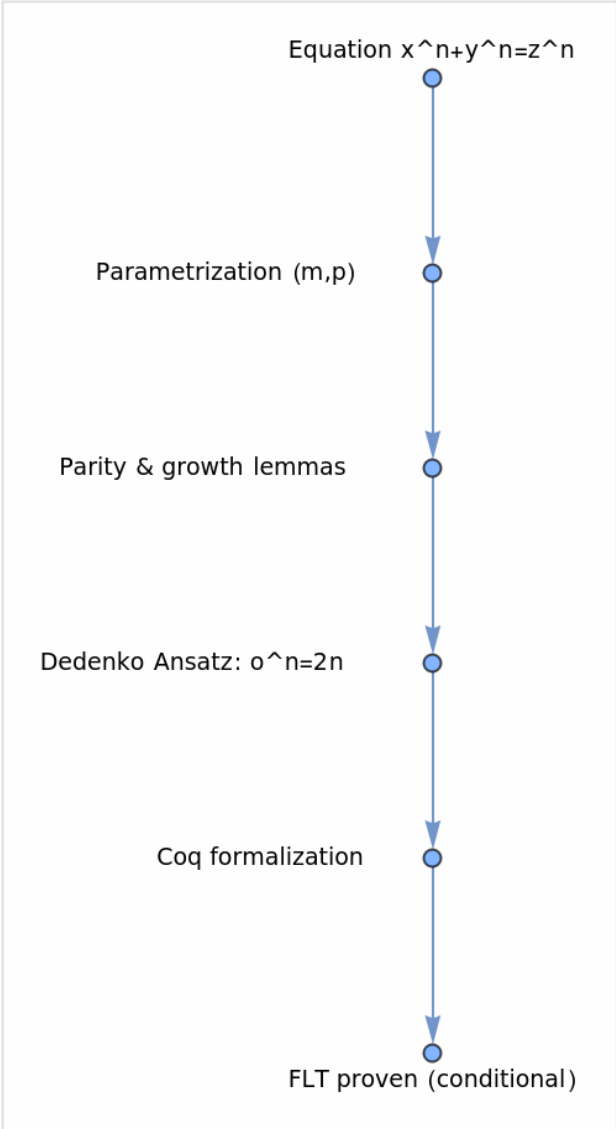

Figure 1: Formal pipeline: global normalization ⇒ FLT (in Coq).

The package includes:

- `FLT.v`: Coq development (no `Admitted`); proofs compile.
- A reasoning flowchart (figure above).
- Explanatory PDFs (EN/RU), updated to the global-normalization reading.

Further reading:

- Reconstruction of Fermat's Proof (ResearchGate) — RU
- Formalization & discussion of the Ansatz — EN