

# Completeness of Peano arithmetic with the $\omega$ -rule

Jaime Gaspar\*

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Gödel's first incompleteness theorem implies that Peano arithmetic is incomplete (there is a sentence that cannot be proved nor refuted). We take a fresh look at the following folklore result: if we add to Peano arithmetic the  $\omega$ -rule

$$\frac{F(0) \quad F(1) \quad F(2) \quad \dots}{\forall n F(n)}$$

(allowing to combine infinitely many proofs into a single infinite proof), then Peano arithmetic becomes complete (every sentence can be proved or refuted). Wee keep this talk short, simple and sweet.

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\*Universitat Rovira i Virgili, Department of Computer Engineering and Mathematics, Av. Països Catalans 26, E-43007 Tarragona, Catalonia, [jaime.gaspar@urv.cat](mailto:jaime.gaspar@urv.cat). Centro de Matemática e Aplicações (CMA), FCT, UNL. Financially supported by the Martí Franquès Research Fellowship Programme grant number 2013PMF-PIPF-24 of the Universitat Rovira i Virgili.