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Engg, KIIT University, Bhubaneswar, Orissa 751024, India. *The Method of Infinite Ascent.*

Unlike the four known techniques - the Direct Method, the Method of Induction, the Method of Contradiction and the Method of Infinite Descent - this new technique will prove helpful in analysing and proving some problems in Diophantine Arithmetic. There are some conjectures in Diophantine equations which are presumed to have no solution in integers. With the known techniques what best we can do for them is to prove that they can have finite number of integral solutions, if they exist. However, to go further in proving the impossibility of an integral solution we will need this new technique. Even for some proved results relating to the said Diophantine equations this method will be easier to apply to reach at the same conclusion. In this paper, we will apply this idea on proving the celebrated Fermat's Last Theorem for powers 3 and 4, and open up a new direction of attack to the problem without the complex mathematics of elliptic curves and modular forms. (Received February 12, 2008)