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Reducing the Erdos-Moser equation $1^n + 2^n + \dots + k^n = (k+1)^n$ modulo k and k^2

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An open conjecture of Erdos and Moser is that the only solution of the Diophantine equation in the title is the trivial solution $1+2=3$. Reducing the equation modulo k and k^2 , we give necessary and sufficient conditions on solutions to the resulting congruence and supercongruence. A corollary is a new proof of Moser's result that the conjecture is true for odd exponents n . We also connect solutions k of the congruence to primary pseudoperfect numbers and to a result of Zagier. The proofs use divisibility properties of power sums as well as Lerch's relation between Fermat and Wilson quotients.

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