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Proof of Fermat's last theorem for $n = 5$ and many odd primes

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Fermat's last theorem has been extensively studied in the recent past specially to see whether it can be proved using elementary mathematics. As a result of this, we have Friedman grand conjecture which states that Fermat's last theorem can be proved using elementary mathematics. A famous logician Colin Mctarty has also reached the same conclusion.

It is shown that parametric representation of x, y, z in Fermat's equation corresponding to $n = 5$ can be obtained using the fundamental theorem of algebra. In the next step, a parametric equation related to the integer factors of x, y, z in the Fermat equation is derived. Fermat's last theorem for $n = 5$ is proved by showing that this equation is never satisfied by the integer factors by deriving an apparent contradiction.

Finally, it is shown how standard Barlow relations are used to derive a parametric equation related to Fermat's last theorem for any odd prime p where $2p + 1$ is also a prime. Fermat's last theorem for any odd prime satisfying the above condition is proved using the above parametric equation and the Remainder theorem as in the case of $n = 5$.