1086-05-115   **Solomon Adegoke Osifodunrin*** (`sosifodunrin@livingstone.edu`), Department of Mathematics, Division of Sciences and Mathematics, Livingstone College, Salisbury, NC 28144.
Non-existence of difference sets with order $n = m^2$, where m is a natural number greater than 1.

The existence of Hadamard $(4t - 1, 2t - 1, t - 1)$ difference sets in cyclic group provides a platform for solving the equation $\delta\bar{\delta} = n$ in the cyclotomic ring $\mathbb{Z}[\zeta_{4t-1}]$, where ζ_{4t-1} is root of unity, $n > 1$ and $t > 1$ are integers. We look at cases where $\langle n \rangle = \langle \delta \rangle \langle \bar{\delta} \rangle$ in $\mathbb{Z}[\zeta_{4t-1}]$ but $\delta\bar{\delta} = n$ has trivial solutions. This criterion is combined with other results to conclude non-existence of some difference sets. (Received July 23, 2012)