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Norm form equations and continued fractions. (English summary)

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The author considers Diophantine equations of the form

$$x^2 - Dy^2 = c,$$

where $c/2D$, $\gcd(x, y) = 1$, and provides criteria for solutions in terms of congruence conditions on the fundamental solution of the Pell equation $x^2 - Dy^2 = 1$. As a consequence of a general result proved in the paper, the author derives the following.

Let D be a positive non-square integer. Let $l = l(\sqrt{D})$ be the period length, $\frac{A_j}{B_j}$ be the j-th convergent in the continued fraction expansion of $\sqrt{D}$, and let the 'complete quotients' be given by

$$(P_j + \sqrt{D})/Q_j$$

with $P_0 = 0$, $Q_0 = 1$. If l is even, it is proved that

$$A_{l-1} \equiv (-1)^{l/2} \pmod{D}$$

if and only if $Q_{l/2} = 2$.

Reviewed by *T. N. Shorey*