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Class number two for real quadratic fields of Richaud-Degert type. (English summary)

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For a positive square-free integer d, a real quadratic field $\mathbb{Q}(\sqrt{d})$ is said to be of Richaud-Degert type (RD-type) if the radicand d is of type $d = m^2 + r$, where $r \mid 4m$. If Δ is a field discriminant associated with a squarefree radicand d, q a squarefree divisor of Δ, and $\alpha_\Delta = 1$ if $4q \mid d$ and $\alpha_\Delta = 2$ otherwise, define the Euler-Rabinowitsch polynomial through $F_{\Delta,q} = qx^2 + (\alpha_\Delta - 1)qx + ((\alpha_\Delta - 1)q^2 - \Delta)(4q)^{-1}$. The author completes the list of RD-type fields with class number two given by him and H. C. Williams [in *Computational number theory (Debrecen, 1989)*, 95–101, de Gruyter, Berlin, 1991; MR1151858 (93d:11118)]. This is done via necessary and sufficient conditions in terms of simple continued fractions of certain quadratic surds and the prime-producing behavior of the Euler-Rabinowitsch polynomials. For some values the determination is unconditional, and for others (the so-called wide RD-types) it is conditional on the Generalized Riemann Hypothesis.

Reviewed by *Štefan Porubský*