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Continued fractions of cubic Laurent series and their effective irrationality exponents

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Abstract. We construct continued fraction expansions for several families of Laurent series in $\mathbb{Q}[[t^{-1}]]$. To the best of the author's knowledge, this is the first result of this kind since Gauss derived the continued fraction expansion for $(1+t)^r$, $r \in \mathbb{Q}$ in 1813. We apply an analogue of the hypergeometric method to one of those families and derive non-trivial efficient lower bounds on the distance $|x - \frac{p}{q}|$ between one of the real roots of $3x^3 - 3tx^2 - 3ax + at$, $a, t \in \mathbb{Z}$ and any rational number, under relatively mild conditions on the parameters a and t.

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