Atelier
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Workshop
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Continued fractions of some Mahler functions and applications to Diophantine approximation

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We consider a class of Mahler functions g(x) which can be written as an infinite product

$$g(x) = 1/x * \prod_{t=0}^{\infty} P(x^{-d^t}),$$

where d is a positive integer and $P(x)$ is a polynomial of degree less than d. In this talk we show that the continued fraction of $g(x)$, written as a Laurent series, can be computed by a recurrent formula. Then we will use this fact to establish several approximational properties of Mahler numbers $g(b)$ for integer $b > 1$ and some functions $g(x)$. In particular we will compute their irrationality exponent in some cases and make non-trivial estimates on it in the other cases. Also, if time permits, we will show that the Thue–Morse number is not badly approximable.

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