

1113-26-100

Pieter C Allaart* (allaart@unt.edu), Mathematics Department, University of North Texas,
1155 Union Cir #311430, Denton, TX 76203-5017. *The infinite derivatives of Okamoto's functions
and β -expansions.*

Okamoto's family $\{F_a : 0 < a < 1\}$ of self-affine functions includes the classical Cantor function ($a = 1/2$) as well as the continuous but nowhere differentiable functions of Perkins ($a = 5/6$) and Bourbaki/Katsuura ($a = 2/3$). The most interesting behavior, as far as differentiability is concerned, takes place in the parameter interval $1/2 < a < 2/3$. This talk will focus on the set $D_\infty(a)$ of points where F_a has an infinite derivative. The theory of expansions of real numbers in non-integer bases (so called β -expansions) turns out to play a vital and unexpected role in determining the size of $D_\infty(a)$. Both the golden ratio and the Thue-Morse sequence will pop up naturally in the investigation. (Received August 13, 2015)