About a family of logistic equations depending on a positive parameter

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SUMMARY

We study the fixed-point equation, given for a fixed $\nu > 0$ by:

$$x = h(1 - |2x - 1|^{\nu}), \quad x,\ h \in \mathbb{R},$$

where $|2x - 1| = \frac{|x - \frac{1}{2}|}{\frac{1}{2}}$ represents the relative distance of x to the mean value of 0 and 1. The particular cases $\nu = 1$ and 2 are classical. This work looks at the question: "How much of the specific behaviour for $\nu = 1$ and 2 remains valid when the exponent ν varies freely in $]0, \infty[$?". Some preliminary answers are given, both theoretical ($\nu \in \mathbb{N}^*$) and experimental ($0 < \nu < 1$).

Keywords: chaos, fixed point, logistic equation

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