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Title: On continuous solutions of n-th order polynomial-like iterative equations

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Many efforts have been made to present all continuous solutions of the iterative equation $\sum_{i=0}^{n} \lambda_i f^i(x) = c$ but for general n only the case of $c = 0$ was considered and no nonhyperbolic cases were discussed. In this paper we first prove that all continuous solutions are decided totally by those real characteristic roots, which not only gives a method to lower the order when complex characteristic roots are involved but also partly answers the question raised in Remark 8 in [Aequationes Math. 2004, 67: 80–105]. Then we find all continuous solutions of the equation with $c = 0$ in the case of smallest characteristic root being 1. Furthermore, we prove that in the case of all characteristic roots being 1 the equation with $c \neq 0$ has no continuous real solutions when n is even.

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