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Rashad U Abdulla* (abdullar@sas.upenn.edu), 4023 Locust Street, Philadelphia, PA 19104, **Ugur G Abdulla** (abdulla@fit.edu), 3627 Mount Carmel Lane, Melbourne, FL 32901, **Batul Kanawati**, California State University of Long Beach, and **Anders Ruden**, University oF Redlands, CA. *On the Structure of Minimal* $4(2k+1)$*-orbits of the Continuous Endomorphisms on the Real Line and Universality in Chaos.*

We consider the problem on the structure of the periodic orbits of period $4(2k+1)$, $k=1,2,...$ of the continuous real line endomorphisms which are minimal with respect to Sharkovski ordering. By developing the new method suggested in *Abdulla et al. J. of Diff. Equat. and Appl., 19,8(2013), 1395-1416,* it is proved that independent of k, there are 64 types of digraphs (and cyclic permutations) with accuracy up to inverse digraphs. We apply this result to the problem on the distribution of periodic windows within the chaotic regime of the bifurcation diagram of the one-parameter family of logistic type unimodal maps. We confirm through numerical analysis the conjecture made in a recent JDEA paper that the first two appearances of all the $2^n(2k+1)$-periodic windows with $k \geq 3$, as well as first appearances of $5 \cdot 2^n$- and $3 \cdot 2^n$-orbits while increasing the parameter are distributed according to a universal law. Every orbit has unique cyclic permutation and digraph independent of the unimodal map. Another revelation of this research is the refinement of the universal law for the third and fourth appearances of the periodic orbits. Understanding the nature and characteristics of this universal route is an outstanding open problem for future investigations. (Received July 21, 2014)