1093-37-201   **Almas U. Abdulla**, **Rashad U. Abdulla** and **Ugur G. Abdulla*** (`abdulla@fit.edu`), Department of Mathematics, Florida Institute of Technology, Melbourne, FL 32901. *Fine Classification of Minimal Orbits of the Continuous Endomorphisms on the Real Line and Universality in Chaos.*

We present a new constructive proof of the result proved independently by Block & Coppel, *Trans. AMS, 297, 2(1986)* and Alseda, Llibre & Serra, *Trans. AMS, 286, 2(1984)* on the structure of minimal $2(2k + 1)$-orbits of continuous endomorphisms on the real line. It is proved that there are 4 types of digraphs (and cyclic permutations) with accuracy up to inverse digraphs. Our method reveals the nature and topological structure of all types of digraphs via straightforward construction. Numerical analysis reveals that the first two appearances of all the $2^n(2k+1)$-periodic windows with $k \geq 3$, within the chaotic regime of the bifurcation diagram of the one-parameter family of logistic type unimodal continuous endomorphisms are distributed according to the following universal law

$$\cdots \to 2^n \cdot 11 \to 2^n \cdot 7 \to 2^n \cdot 9 \to 2^n \cdot 5 \to 2^n \cdot 7 \to 2^n \cdot 3 \to \cdots \to 11 \to 7 \to 9 \to 5 \to 7 \to 3 \to \ldots \qquad (1)$$

The first appearance of all $2(2k + 1)$-orbits is always minimal $2(2k + 1)$-orbit with Type I digraph according to our classification. (Received August 13, 2013)