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**Ugur G Abdulla** and **Rashad U Abdulla\***, [abdullar@sas.upenn.edu](mailto:abdullar@sas.upenn.edu), and **Alyssa L Turnquist**, **Muhammad U Abdulla** and **Naveed Iqbal**. *On the Fine Classification of Periodic Orbits of Continuous Endomorphisms on the Real Line and Universality in Chaos.*

We complete the classification of the periodic orbits of period  $2^n(2k+1)$ ,  $k > 1$ , of the continuous endomorphisms on the real line which are minimal with respect to Sharkovski ordering. By developing the new constructive 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  $2^{2^{n+1}-2}$  types of digraphs with accuracy up to inverse digraphs. We pursue full analysis of the second minimal 7-orbits, where second minimal odd orbits immediately follow the minimal orbits with respect to Sharkovski ordering. It is proved that there are 9 types of second minimal 7-orbits with accuracy up to inverses. We apply this result to the problem on the distribution of superstable periodic windows within the chaotic regime of the bifurcation diagram of the one-parameter family of logistic type unimodal maps. It is revealed that by fixing the maximum number of appearances of the periodic windows there is a universal pattern of distribution. Yet another important development of this research is the revelation of the pattern of the pattern dynamics with respect to increased number of appearances. Understanding the nature of this universal route is an outstanding open problem for future investigations. (Received July 27, 2015)