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ON MIXED JOINT UNIVERSALITY

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Universality of zeta and L-functions is one of the most interesting phenomenons of analytic number theory. Roughly speaking, it means that every analytic function can be approximated with a given accuracy by shifts of the considered zeta or L-functions, uniformly on compact subsets of a certain region. In 1975, S. M. Voronin discovered the universality property of the Riemann zeta-function $\zeta(s)$, $s = \sigma + it$. Later, it turned out that other classical zeta and L-functions are also universal in the Voronin sense. Moreover, some zeta and L-functions have a joint universality property. In this case, a given collection of analytic functions is approximated simultaneously by shifts of zeta and L-functions.

Our talk contains the basic universality results on the so-called mixed joint universality initiated by H. Mishou who in 2007 obtained the joint universality for the Riemann zeta and Hurwitz zeta-functions. In a wide sense, the mixed joint universality is understood as a joint universality for zeta and L-functions having and having no Euler product. Also, in the report, a new result [1] on mixed joint universality for some L-functions from the famous Selberg class and periodic Hurwitz zeta-functions will be presented. Here we would like to accent that L-functions from the Selberg class (introduced by A. Selberg in 1989) satisfy certain hypotheses, including the Euler product, while the periodic Hurwitz zeta-functions, which are a generalization of classical Hurwitz zeta-functions, can not be expressed by Euler product.

REFERENCES

[1] R. Macaitienė. Joint universality for L-functions from Selberg's class and periodic Hurwitz zeta-functions. *Ukrainian Math. J.*, (submitted).