

On the boundedness of the periodic Hilbert transform on generalized periodic Morrey spaces

Sh.Baituyakov ¹, Zh. Baituyakova ², M. Ilyasova ³

¹ *Department of Mechanics and mathematics, L.N. Gumilyov Eurasian National University, Astana, Kazakhstan*

E-mail: baituyakova.zhzh@yandex.ru

² *Kazakh University of Technology and Business, Astana, Kazakhstan*

E-mail: baituyakov.sh@yandex.ru

³ *Department of Mechanics and mathematics, L.N. Gumilyov Eurasian National University, Astana, Kazakhstan*

E-mail: meruert.ilyasova@yandex.ru

Abstract: The Hilbert transform is one of the most important operators in the field of signal theory. Mainly, the importance of the transform is due to its property to extend real functions into analytic functions. This property certainly induces a vast number of applications, especially in signal theory, and obviously the Hilbert transform is not merely of interest for mathematicians. This paper dedicated to the investigation of boundedness of periodic Hilbert transform on generalized periodic Morrey spaces. First, we give definitions of Morrey space and generalized Morrey space [1], [2], [3]. Then we prove the boundedness of periodic Hilbert transform on generalized periodic Morrey spaces. The boundedness of Hilbert transform on (nonperiodic)generalized Morrey space we refer to [4]. As a consequence, given uniform estimates of the operator norms of the partial sums of Fourier series on generalized periodic Morrey spaces.

Keywords: Hilbert transform, partial sums of Fourier series

2010 Mathematics Subject Classification: 44A15, 42A24

REFERENCES

- [1] M. Sautbekova, W. Sickel, “Strong summability of Fourier series and Morrey spaces, *Analysis Math.*, 40, pp. 31-62, 2014.
- [2] T. Mizuhara, “Boundedness of some classical operators on generalized Morrey spaces, *Harmonic Anal.*, 4, pp.183-189, 1991.
- [3] E.Nakai, “Hardy-Littlewood maximal operator, singular integral operators and the Riesz potential on generalized Morrey spaces, *Math. Nachr.*, 166, pp. 95-103, 1994.
- [4] D.Hakim, E. Nakai, Y. Sawano, “Generalized fractional maximal operators and vector-valued inequalities on generalized Orlicz-Morrey spaces, *Rev.Mat.Complut*, DOI 10.1007/s13163-015-0178-6, 2015.