

## ON BEHAVIOR OF FOURIER COEFFICIENTS AND UNIFORM CONVERGENCE OF FOURIER SERIES IN THE HAAR SYSTEM

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ABSTRACT. Suppose that  $\hat{b}_m \downarrow 0$ ,  $\{\hat{b}_m\}_{m=1}^\infty \notin l^2$ , and  $b_n = 2^{-\frac{m}{2}} \hat{b}_m$  for all  $n \in (2^m, 2^{m+1}]$ . In this paper, it is proved that any measurable and almost everywhere finite function  $f(x)$  on  $[0, 1]$  can be corrected on a set of arbitrarily small measure to a bounded measurable function  $\tilde{f}(x)$ ; so that the nonzero Fourier–Haar coefficients of the corrected function present some subsequence of  $\{b_n\}$ , and its Fourier–Haar series converges uniformly on  $[0, 1]$ .

### REFERENCES

1. F. G. Arutyunyan, *On series in the Haar system*, ANA SSR Dokl. **42** (1966), no.3, 134–140.
2. R. A. DeVore, V. N. Temlyakov, *Some remarks on greedy algorithms*, Adv. Comput. Math. **5** (1966) no. 2-3, 173–187.
3. S. A. Episkoposyan, *On the existence of universal series by the generalized Walsh system*, Banach J. Math. Anal. **10** (2016), no. 2, 415–429.
4. L. N. Galoyan, M. G. Grigoryan, A. Kh. Kobelyan, *Convergence of Fourier series in classical systems*, Sbornik Mathematics **206** (2015), no. 7-8, 941–979. Matematicheski Sbornik **206** (2015), no. 7, 55–94.
5. M. G. Grigorian, *On the convergence of Fourier series in the metric of  $L^1$* , Anal. Math. **17** (1991), 211–237.
6. M. G. Grigoryan, *On the universal and strong  $(L^1, L^\infty)$ -property related to Fourier–Walsh series*, Banach J. Math. Anal. **11** (2017), no. 3, 698–712.

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7. M. G. Grigoryan, V.G. Krotov, *Luzin's Correction Theorem and the Coefficients of Fourier Expansions in the Faber-Schauder System*, Math. Notes **93** (2013), no. 2, 11–17.
8. A. Haar, *Zur Theorie der orthogonalen Funktionensysteme*, Math. Ann. **69** (1910), no. 3, 331–371.
9. N. N. Luzin, *On the basic theorem of integral calculus*, Mat. Sbornik **28** (1912), 266–294.
10. J. Marcinkiewicz, *Quelques theoremes sur les series orthogonales*, Ann. Soc. Polon. Math., **16** (1937), 84–96 (pp. 307–318 of the Collected Papers).
11. D. E. Menchoff, *Sur la convergence uniforme des series de Fourier*, Mat. Sbornik **53** (1942), no. 1-2, 67–96.(French)
12. K. A. Navasardyan, A. A. Stepanyan, *Series by Haar system*, Izv. Nats. Akad. Nauk Armenii mat. **42** (2007), no. 4, 53–66.
13. A. M. Olevskii, *Modification of functions and Fourier series*, Uspekhi Mat. Nauk, 40 (1985), no. 3(243), 157–193.
14. K. I. Oskolkov, *The uniform modulus of continuity of integrable functions on sets of positive measure*, Dokl. Akad. Nauk SSSR **229** (1976), 304–306.
15. J. J. Price, *Walsh series and adjustment of functions on small sets*, Illinois J. Math. **13** (1969), no. 1,131–136.

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