

## ASYMPTOTIC ESTIMATES FOR APPROXIMATION NUMBERS OF THE HARDY OPERATOR IN $Q$ -BANACH SPACES

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*Abstract.* The asymptotic estimates of the approximation numbers of the weighted Hardy operator are given.

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### REFERENCES

- [1] D. E. EDMUNDS, W. D. EVANS, D. J. HARRIS, *Approximation numbers of certain Volterra integral operators*, J. London Math. Soc., **45** (1988), 471–489.
- [2] D. E. EDMUNDS, W. D. EVANS, D. J. HARRIS, *Two-sided estimates of the approximation numbers of certain Volterra integral operators*, Studia Math., **124** (1997), 59–80.
- [3] E. LOMAKINA, V. STEPANOV, *On asymptotic behaviour of the approximation numbers and estimates of Schatten von Neumann norms of the Hardy-type integral operators. Function spaces and application*, Narosa Publishing Hause, New Delhi, 2000, pp. 153–187.
- [4] M. A. LIFSHITS, W. LINDE, *Approximation and entropy numbers of Volterra operators with application to Brownian motion*, Mem. Am. Math. Soc., **745** (2002), 1–87.
- [5] E. N. LOMAKINA, V. D. STEPANOV, *Asymptotic estimates for the approximatn and entropy numbers of the one-weight Riemann-Liouville operator*, Siberian Advances in Mathematics, **17**, 1 (2007), 1–36.
- [6] W. LINDE, *s-numbers of diagonal operator and Besov embedding*, Rend. Circ. Mat. Palermo, **2** (1986), 83–110.