

SHARP CONSTANT FOR $L^p - L^\infty$ TYPE SOBOLEV'S INEQUALITY

HONGWEI LOU

Abstract. Sharp constants for $L^p - L^\infty$ type Sobolev's inequalities $\|y\|_\infty \leq C \|\Delta^k y\|_p$ and $\|y\|_\infty \leq C \|\nabla(\Delta^k y)\|_p$ are studied. The problems are solved by using Green's function and rearrangement theory.

Mathematics subject classification (2010): 26D10, 34B27, 46E35.

Keywords and phrases: Sharp constant, Sobolev's inequality, Green's function, rearrangement.

REFERENCES

- [1] A. BURCHARD, *A short course on rearrangement inequalities*, Notes to the Course: MAT, **495** (2009), 391–400.
- [2] E. DI BENEDETTO, *$C^{1,\alpha}$ local regularity of weak solutions of degenerate elliptic equations*, Nonlinear Analysis, T.M.A., **7** (1983), 827–850.
- [3] Y. KAMETAKA, H. YAMAGISHI, K. WATANABE, A. NAGAI AND K. TAKEMURA, *Riemann zeta function, Bernoulli polynomials and the best constant of Sobolev inequality*, Scientiae Mathematicae Japonicae, **65**, 3 (2007), 333–360.
- [4] Y. OSHIME, *On the best constant for L^p Sobolev inequality*, Sci. Math. Jpn. **68** (2008), 333–344.
- [5] P. LINDQVIST, *Notes on the p -Laplace equation*, University of Jyväskylä, Department of Mathematics and Statistics, 2006.
- [6] Y. OSHIME, Y. KAMETAKA AND H. YAMAGISHI, *The best constant of L^p Sobolev inequality corresponding to the periodic boundary value problem for $(d/dx)^{4m}$* , Sci. Math. Jpn. **68** (2008), 313–321.
- [7] Y. OSHIME AND K. WATANABE, *The best constant of L^p Sobolev inequality corresponding to Dirichlet boundary value problem II*, Tokyo J. Math. **34**, 1 (2011), 115–133.
- [8] G. TALENTI, *Best Constant in Sobolev Inequality*, Ann. Mat. Pura Appl., **110** (1976), 353–372.
- [9] G. TALENTI, *Elliptic equations and rearrangements*, Annali della Scuola Normale di Pisa, Classe di Scienze, **3**, 4 (1976), 697–718.