



Self-improving properties for abstract Poincaré type inequalities

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(Submitted on 12 Jul 2011)

We study self-improving properties in the scale of Lebesgue spaces of generalized Poincaré inequalities in the Euclidean space. We present an abstract setting where oscillations are given by certain operators (e.g., approximations of the identity, semigroups or mean value operators) that have off-diagonal decay in some range. Our results provide a unified theory that is applicable to the classical Poincaré inequalities and furthermore it includes oscillations defined in terms of semigroups associated with second order elliptic operators as those in the Kato conjecture. In this latter situation we obtain a direct proof of the John-Nirenberg inequality for the associated BMO and Lipschitz spaces of [HMay,HMM].

Comments: 42 pages

Subjects: **Classical Analysis and ODEs (math.CA)**

Cite as: **arXiv:1107.2260 [math.CA]**

(or **arXiv:1107.2260v1 [math.CA]** for this version)

Submission history

From: Frederic Bernicot [[view email](#)]

[v1] Tue, 12 Jul 2011 12:19:40 GMT (36kb)

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