A simple proof of the Poincaré inequality for a large class of probability measures

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Abstract

Abstract. We give a simple and direct proof of the existence of a spectral gap under some Lyapunov type condition which is satisfied in particular by log-concave probability measures on R^n. The proof is based on arguments introduced in Bakry and al, but for the sake of completeness, all details are provided.

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Bibliography

1. C. Ané, S. Blachère, D. Chafai, P. Fougè, I. Gentil, F. Malrieu, C. Roberto, and G. Scheffer. Sur les inégalités de Sobolev logarithmiques, volume 10 of Panoramas et Synthèses. Société Mathématique de France, Paris, 2000.
2. D. Bakry, P. Cattiaux, and A. Guillin. Rate of convergence for ergodic continuous Markov processes : Lyapunov versus Poincaré. J. Func. Anal., 254:727-759, 2008.
3. Bobkov, S. G. Isoperimetric and analytic inequalities for log-concave probability measures. *Ann. Probab.* 27 (1999), no. 4, 1903--1921. MR1742893 (2001h:60026)
4. Cattiaux, Patrick. Hypercontractivity for perturbed diffusion semigroups. *Ann. Fac. Sci. Toulouse Math. (6)* 14 (2005), no. 4, 609--628. MR2188585 (2006i:60112)
5. P. Cattiaux, A. Guillin, F. Y. Wang, and L. Wu. Lyapunov conditions for logarithmic Sobolev and super Poincare inequality. Available on Math. ArXiv 0712.0235., 2007.
6. Fougères, Pierre. Spectral gap for log-concave probability measures on the real line. *Séminaire de Probabilités XXXVIII,* 95--123, Lecture Notes in Math., 1857, *Springer, Berlin,* 2005. MR2126968 (2006a:60018)
7. Ledoux, Michel. Spectral gap, logarithmic Sobolev constant, and geometric bounds. *Surveys in differential geometry. Vol. IX,* 219--240, Surv. Differ. Geom., IX, *Int. Press, Somerville, MA,* 2004. MR2195409 (2007f:58049)
8. Wu, Liming. Uniformly integrable operators and large deviations for Markov processes. *J. Funct. Anal.* 172 (2000), no. 2, 301--376. MR1753178 (2001e:60062)