

LOG-SOBOLEV INEQUALITIES FOR DIFFUSIONS WITH UNBOUNDED BELOW CURVATURES

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Abstract: We prove that for a log-concave potential the optimal curvature condition for the log-Sobolev inequality to hold is that the Ricci curvature is bounded below by negative distance square. This provides a large class of hypercontractive diffusion semigroups whose curvature is unbounded from below. Moreover, the different roles played by the Ricci curvature and the Hessian of the potential are clarified for the log-Sobolev inequality to hold.