
A simplified approach to the regularising effect of nonlinear semigroups

Daniel Hauer*¹ and Coulhon Thierry[†]

¹School of Mathematics and statistics - The University of Sydney – School of Mathematics and Statistics F07, University of Sydney, NSW 2006 Australia, Australia

Abstract

Since the beginning of the 21st century, there appeared a huge flow of papers written on the regularising effect of nonlinear semigroups. Most authors of these papers follow the same approach: As a first step, a Log-Sobolev inequality is derived from a known Sobolev inequality. Then by using the Log-Sobolev inequality, one shows that the function $t \mapsto \|T_t\|_{r(t)}$ satisfies a differential inequality which is strong enough to conclude an L^p - L^q -regularisation of the trajectories $t \mapsto T_t\varphi$ of the given semigroup $\{T_t\}$. In this talk, we present a simplified approach to this regularity effect and apply our method to various examples.

The results presented here are obtained in joint work with Prof. Thierry Coulhon (Paris Sciences et Lettres, Département de Mathématiques et Applications, École Normale Supérieure, 62 bis rue Gay-Lussac, 75005 Paris, France)

*Speaker

[†]Corresponding author: thierry.coulhon@univ-psl.fr