Flows of Sobolev homeomorphisms

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Certain non-Lipschitz vector fields produce well defined flows of Sobolev homeomorphisms. Particular examples of this fact can be found in Geometric Function Theory , as well as in Fluid Mechanics. In the first case, the optimal Sobolev regularity of the t-advance maps can be obtained as a consequence of Astala's area distortion Theorem. In the second, though, the question remains unsolved, due (among other reasons) to the lack of a counterpart to the metric characterization of quasiconformality. Therefore, finding the optimal Sobolev regularity seems to require new tools, even in the plane. Some tentative first steps towards a solution will also be presented.

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