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A Hamilton-Jacobi approach to junction problems and application to traffic flows

Cyril Imbert (CEREMADE, DMA), Régis Monneau (CERMICS), Hasnaa Zidani (INRIA Saclay - Ile de France, UMA)

(Submitted on 16 Jul 2011 (v1), last revised 28 Nov 2011 (this version, v2))

This paper is concerned with the study of a model case of first order Hamilton-Jacobi equations posed on a "junction", that is to say the union of a finite number of half-lines with a unique common point. The main result is a comparison principle. We also prove existence and stability of solutions. The two challenging difficulties are the singular geometry of the domain and the discontinuity of the Hamiltonian. As far as discontinuous Hamiltonians are concerned, these results seem to be new. They are applied to the study of some models arising in traffic flows. The techniques developed in the present article provide new powerful tools for the analysis of such problems.

Comments:	This paper is dedicated to J.-B. Hiriart-Urruty. Note on v3: to appear in ESAIM: COCV
Subjects:	**Analysis of PDEs (math.AP)**
Cite as:	**arXiv:1107.3250 [math.AP]**
	(or **arXiv:1107.3250v2 [math.AP]** for this version)

Submission history

From: Cyril Imbert [view email]
[v1] Sat, 16 Jul 2011 20:04:29 GMT (48kb,D)
[v2] Mon, 28 Nov 2011 14:48:52 GMT (47kb,D)

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