

## Duality and existence for a class of mass transportation problems and economic applications

Guillaume Carlier

Université Bordeaux 1, MAB, UMR CNRS 5466 and Université Bordeaux IV,  
GRAPE, UMR CNRS 5113, Avenue Léon Duguit, 33608, Pessac, FRANCE

**Received:** April 15, 2002

**Revised:** May 20, 2002

**JEL classification:** C61, C82

**Mathematical Subject Classification (2000):** 90C08, 90C46, 91B40

**Abstract.** We establish duality, existence and uniqueness results for a class of mass transportations problems. We extend a technique of W. Gangbo [9] using the Euler Equation of the dual problem. This is done by introducing the *h-Fenchel Transform* and using its basic properties. The cost functions we consider satisfy a generalization of the so-called *Spence-Mirrlees condition* which is well-known by economists in dimension 1. We therefore end this article by a somehow unexpected application to the *economic theory of incentives*.

**Key words:** mass transportation, duality, general Fenchel transform, economic theory of incentives, Spence-Mirrlees condition