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We consider optimal control problems over the Wasserstein space. On the one hand, there is now a stable theory of absolutely continuous curves of measures, characterized as the solutions of the continuity equation. In particular, for sufficiently regular dynamics, the trajectories enjoy a nice representation as the pushforward through the semigroup of the underlying ODE. On the other hand, control problems are naturally linked to the viscosity solutions of Hamilton–Jacobi (HJ) equations. Our aim is to contribute to the extension of the viscosity theory over the Wasserstein space. We explore the choice of a particular set of test functions, including the squared distance, that allows us to obtain a weak comparison principle and verify that the value function of the control problem is the unique Lipschitz and bounded solution of the corresponding HJ equation. In addition, this choice bears strong links with subdifferential notions of the literature.

*Joint work with Othmane Jerhaoui (INSA Rouen, France) and Hasnaa Zidani (INSA Rouen, France).*