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Optimal transportation under càdlàg martingale

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The price of underlying asset is assumed to be a càdlàg function of time. The primal problem a martingale optimal transport problem of maximizing the expected value of the payoff function over all martingale measures having the given marginals at fixed maturities and we study the analytic behavior of the primal value function by S-topology on $\mathbb{D}^d$. Using this topology we prove that the primal value function is upper semi-continuous w.r.t. the given family of marginal laws. As a consequence a Fenchel duality is derived which gives a scheme for calculating algorithms. As an application of the upper semi-continuity the Kantorovich duality is established, which has the financial interpretation as the robust hedging of path dependent European options.