EXISTENCE AND LIPSCHITZ REGULARITY OF SOLUTIONS TO BOLZA PROBLEMS IN OPTIMAL CONTROL

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We investigate the existence and Lipschitz continuity of optimal trajectories for the Bolza problem in control theory. In the non-automomous case, under Tonelli's type growth condition, we prove Lipschitz regularity of optimal trajectories for a class of problems with state constraints. As a corollary, we obtain Lipschitzianity of minimizers for the non autonomous classical problem of the Calculus of Variations with discontinuous Lagrangian. In the autonomous case, we prove existence and Lipshitzianity of optimal solutions. The main feature of our results is that they relax the usual fast growth condition for the Lagrangian. Furthermore, we show that optimal solutions do satisfy the Du Bois-Reymond necessary optimality condition.