

On infinite horizon optimal control problems

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Abstract

Still at the beginning of the previous century the optimal control problems with infinite horizon became very important with regards to applications in economics, where an infinite horizon seems to be a very natural phenomenon. These problems were treated by many authors and various necessary, sufficient as well as transversality conditions were obtained. In general, the validity of Pontryagin's Maximum Principle as necessary optimality condition was not shown up to now. In a famous counter-example of Halkin it was demonstrated that a natural extension of the transversality condition $\lim_{t \rightarrow \infty} y(t) = 0$ does not hold. By construction of a dual problem in weighted Sobolev-spaces we show, how an adequate transversality condition looks like. We solve the example of Halkin by dual methods.